STATE OF NEW YORK

Board of Hudson River-Black River Regulating District
350 Northern Boulevard, Albany, New York 12204 Phone (518) 465-3491
FAX (518) 432-2485

February 4, 2010

Honorable William Peck, Chairman
Saratoga County Board of Supervisors
40 McMaster Street
Ballston Spa, New York 12020

Re: Hudson River – Black River Regulating District
Apportionment
Apportionment Grievance Hearing – March 30, 2010

Dear Chairman Peck:

The Hudson River – Black River Regulating District maintains facilities in the Hudson River Area, including the Great Sacandaga Lake, which provide flood protection to Saratoga County. As it has done for the last eighty-five years, and pursuant to NY Environmental Conservation Law Article 15, Title 21, the Regulating District Board is required to apportion and assess the cost to maintain such facilities among the parcels of real estate and public corporations benefited by such facilities. Between 1930 and 2008, the owners of hydroelectric projects downstream of the Great Sacandaga Lake comprised 82% of the Regulating District's beneficiaries. Recently, in Albany Engineering Corp. v FERC (548 F3rd. 1071, 2008) the D.C. Circuit Court of Appeals ruled that the Federal Power Act preempts the Regulating District -- a FERC license holder in the Hudson River watershed -- from assessing under State law hydroelectric projects that are downstream from the Conklingville Dam which creates Great Sacandaga Lake. As a result, the Regulating District was compelled to prepare a new apportionment through which Saratoga County will now share a portion of those costs. Following approval by the Department of Environmental Conservation, and as required by NY ECL §15-2121(4), on behalf of the Regulating District Board, please find a copy of the Apportionment for the Regulating District's fiscal year July 2009 – June 2010 served upon you as Chairman of the Saratoga County Board of Supervisors. As required by statute, a copy of the Apportionment will also be filed in the Office of the County Clerk. Remittance is due upon receipt, but no later than June 30, 2010.

Also enclosed, please find a copy of a legal notice identifying the time and place where the Regulating District Board will meet to hear any public corporation or person aggrieved by the Apportionment. In addition, please find enclosed: copies of the Resolution through which the Regulating District adopted the Apportionment at its January 12, 2010 meeting; the letter from Commissioner Grannis through which the Department of Environmental Conservation approved the Apportionment; the Regulating District's rule governing the Apportionment

Grievance Hearing process; and the documents prepared for the Regulating District Board in support of its determination.

Staff will give a short presentation beginning at 9 a.m. March 30th immediately preceding the meeting at which the Regulating District Board will conduct the Apportionment Grievance Hearing. This presentation will provide a brief history of the Regulating District and outline the issues guiding the Board to determine the new Apportionment.

Please feel free to contact me if you have any questions. Thank you.

Sincerely,

Glenn A. LaFave
Executive Director

cc: David A. Wickerham, Saratoga County Administrator
Mark M. Rider, Saratoga County Attorney
Kathleen A. Marchione, Saratoga County Clerk

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March 23, 2010

Board of Hudson River-Black River Regulating District
350 Northern Boulevard
Albany, NY 12204

Dear Sirs:

Delivered herewith is the Grievance Complaint of the County of Saratoga, complaining of the apportionment of the assessment of costs of the Great Sacandaga Lake against the County of Saratoga.

Please be advised that the County of Saratoga requests allotment of 15 minutes for its presentation at the March 30 hearing.

Thank you for your attention to the above.

Very truly yours,

MARK M. RIDER

MMR/cg
Encl.

HUDSON RIVER BLACK RIVER REGULATING DISTRICT
COUNTY OF ALBANY
STATE OF NEW YORK

In the Matter of the

COMPLAINT
and

COMPLAINT

DEMAND FOR MODIFICATION OF
THE COUNTY OF SARATOGA
of
The Apportionment of a Portion of the
Cost and Expense of the Great Sacandaga
Reservoir by the

HUDSON RIVER BLACK
RIVER REGULATING DISTRICT

The County of Saratoga, as a Public Corporation aggrieved by the apportionment to it of a portion of the total cost and expense of the Great Sacandaga Lake Reservoir by the Hudson River Black River Regulating District, as and for a complaint and demand for modification of said appropriation, sets forth the following.

1. The Complainant County of Saratoga is a municipal corporation of the State of New York, with offices located at 40 McMaster Street, Ballston Spa, New York.

2. The name and, address and telephone number of the representative of the Complainant is Mark M. Rider, Saratoga County Attorney, 40 McMaster Street, Ballston Spa, New York 12020 (518-884-4770).

3. On or about January 12, 2010, the Board of the Hudson River Black River Regulating District Board (hereinafter "the Board") made an "Apportionment of Operation and Maintenance Cost of the Great Sacandaga Lake Reservoir" (hereinafter "the Apportionment"), purportedly in compliance with New York State Environmental Conservation Law Section 15-2121.

4. By said Apportionment, the Board apportioned to Complainant County of Saratoga 33.69% of the operation and maintenance cost of the Great Sacandaga Lake Reservoir (hereinafter "the Costs"), and assessed to it the amount of $1,500,489.21 to be paid for the HRBRRD's fiscal year July 2009 – June 2010.

5. The said apportionment is unlawful, for the reasons that follow.

NO CHANGE IN THE EQUITABLE LIABILITY OF THE COUNTY

6. ECL §15-2121 (6) sets forth the statutory basis for the original apportionment of the Costs, which was accomplished by the Board in or around 1925.

7. In regards to the original apportionment, ECL §15-2121 (6) provides in pertinent part as follows:

> Such apportionment and determination, when finally made, also shall be deemed to fix and determine the apportionment and the basis of apportionment of all subsequent expenses to be incurred in the maintenance and operation of such reservoir, including the amount of a reasonable return to the state, if any, as provided for in title 21 of this article.

8. ECL §15-2121 (7) sets forth the statutory authorization for any subsequent apportionment, such as the January 12, 2010 apportionment.

9. Relative to subsequent apportionment, ECL §15-2121(7) provides in pertinent part as follows:

> If powers be developed after such apportionment has been made or if for any other reason any public corporation or any parcel of real estate becomes liable equitably for such subsequent expenses, a subsequent apportionment may be made in the same manner and subject to the same review as the original apportionment.

10. The said language requires that, before a new apportionment can be made, a public corporation must "become liable equitably" for subsequent expenses. Applying this language, a change in regard to the status of a public corporation must occur which makes it "become" liable for costs.

11. Indeed, the language of the original version of the current law even more specifically stated the preconditions to altering the apportionment, as follows:

> §461. Lands exempt and later liable to assessment. If any lands in any district organized under this article are not liable for assessment at the time of the creation of the reservoir, but afterwards during the period when such reservoir is being paid for become liable to assessment by reason of some change in condition or ownership, the benefits to such real estate shall thereupon be apportioned and the amount thereof assessed as other real estate in said district receiving equal benefits, and such added assessments shall be levied and collected as other assessments and paid into the funds of the district for the uses thereof.

> §462. Subsequent assessments. In case any real estate within the district is benefited, which for any reason was not assessed, or in case any public corporation or real estate of any person shall receive benefits from the improvement in any district organized under the article to a degree not considered in the original apportionment of benefits the board shall make a reapportionment of such benefits, or in case the board find it necessary subsequent to the time when the first assessments are made to take or damage any additional property, the board shall levy and assess the expense thereof. Proceedings outline in this article for apportionment of benefits and levy, assessment and collection of the cost and expenses of the improvement, shall in all matters be conformed with, or the board may at its discretion make any suitable settlement for such benefit, damage or property taken. (emphasis added Chapter 622 Laws of 1915: Sections 461 and 462 of the Conservation Law)

12. While the later version of the law was streamlined, the requirement remains that some change in the benefits received by a public corporation is required before its portion of cost can be changed.

13. The original apportionment determined that the Complainant County of Saratoga, a public corporation, was not equitably liable for any costs of the Great Sacandaga Lake Reservoir.

14. There has been no change to the status of the Complainant County of Saratoga that alters the equitable liability of the Complainant County of Saratoga from the original determination of the Board of no liability.

15. The statutory condition precedent to the Board making a subsequent apportionment to include the Complainant County of Saratoga has not occurred, and the apportionment is therefore illegal.

FAILURE TO APPORTION COST TO THE STATE

16. ECL §15-2121(2) requires the Board to determine the portion of the Costs chargeable to the State of New York, and to reduce the total costs by the resultant amount before apportioning the remaining costs among the public corporations and parcels of real estate benefited by the Great Sacandaga Lake Reservoir.

17. A quick glance at the map of Saratoga County would have revealed to the Board that, in Saratoga County alone, New York State Route 9N has a bridge crossing the Hudson River and its flood plain near Hadley, and continues adjacent to the River for several miles south to Corinth; that Route 87 has a bridge crossing over the Hudson River in the Town of Moreau; that New York Sate Route 9 has a bridge over the Hudson River at South Glens Falls; that New York State Route 4 has a bridge over the Hudson River north of Schuylerville, and continues south along the River all the way through Waterford to a bridge over the Hudson River to the City of Troy with much of that distance being in the 100 year flood plain of the Hudson River. New York State Route 129 crosses the Hudson River by a bridge at Schuylerville. New York State Route 67 crosses the Hudson River by a bridge at Mechanicville. New York State Route 4 crosses the Hudson by a bridge in Waterford. All of these highways receive a flood protection benefit not considered by the Board.

18. In addition, the State of New York Canal Corporation has a series of locks and facilities in the Hudson River which receive a flood protection benefit. (The Gomez and Sullivan report, cited in counsel's memorandum to the Board dated December 29, 2009, considered only the flow control benefit related to the canal, not flood protection. Gomez and Sullivan Engineers, P.C., "Final Report, Hudson River Flow Regulation Benefit Study, July 2003, Exhibit G).

19. In addition, the State maintains a State Emergency Management Administration (SEMA) which responds to natural disasters such as floods. If the Reservoir did not exist, in fact the cost of a 2, 4, 10, 50 or 100 year flood would ultimately be a state cost through SEMA assistance. The State thereby generally benefits from flood control of the Reservoir, by the reduction in severity and frequency of floods.

20. In addition, the State benefits from the recreational aspects of the Reservoir, both on Sacandaga Lake, in the white water rapids downstream of the Conklinwille Dam, and throughout the Hudson River to the Atlantic. The benefit to commercial and pleasure navigation below and above Albany are also a general benefit to the State.

21. While these benefits are duly listed in the Gomez and Sullivan Report commissioned and received by the Board, no attempt was made to include them in the apportionment.

22. The Board has failed to make any required determination of the amount of costs attributable to the State, and its apportionment does not reduce the total cost by an amount attributable to the State, as required by ECL §15-2121(2).

FAILURE TO DETERMINE BENEFIT TO COMPLAINANT

23. ECL §15-2121(2) requires the Board to determine the "...amount of benefit which will inure to each public corporation..." by reason of the Reservoir.

24. The methodology of the Board in apportioning cost to the Complainant County of Saratoga consisted of totaling the equalized assessed valuations of parcels of real property partially or wholly within the hypothetical 100 year flood plain of the Hudson River without the Reservoir within Saratoga County, and dividing it by the total equalized assessed valuations of parcels of real property partially or wholly within the hypothetical 100 year flood plain of the Hudson River within Washington, Warren, Saratoga, Rensselaer and Albany Counties.

25. The Board's methodology did not in any manner identify, consider, calculate or determine any benefit derived by the Complainant County of Saratoga by reason of the Reservoir.

26. The Board apparently determined that "...flood protection is the most direct and clearly defined benefit...." and failed to identify, quantify or evaluate any other benefit of the Reservoir. (See "Memorandum" dated 1/7/2010).

27. The Board knew or had reason to know that there are additional benefits created by the construction of the Reservoir, including:

- Increased Real Estate Values for Lakeshore Property
- Lake Recreation
- Hydroelectric Power Generation
(- Flood Protection)
- Waste Assimilation
- Whitewater Recreation
- Water Supply
- Downstream Water Recreation
- Downstream Fisheries Enhancement
- Navigation

The listed benefits are identified in the "Hudson River Flow Regulation Benefit Study" prepared for HRBRRD by Gomez and Sullivan Engineers, P.C. and dated July 2003, at Page 2. (Exhibit G).

28. The Board apparently concluded that the Complainant County of Saratoga benefited by avoiding loss of public infrastructure, but failed to identify any infrastructure of the County that would be lost, and failed to evaluate the cost of damage thereto.

29. The sole criteria used by HRBBRD to quantify a benefit to the Complainant County of Saratoga is the assessed valuation of the parcels owned by various individuals and entities which are located partially or wholly within a hypothetical 100 year flood plain of a hypothetical Hudson River without the Reservoir, as shown on the ArcGIS overlay mapping system.

30. None of the said properties are owned by the Complainant County of Saratoga, and their assessed value is not relevant to any benefit accruing to the Complainant by virtue of the Reservoir.

31. There is no reasonable, rational or legal basis for the apportionment to the County of Saratoga of 33.69% of the cost of the Great Sacandaga Lake Reservoir based on the methodology used by the Board.

FAILURE TO APPORTION COST TO OTHER BENEFICIARIES

32. ECL §15-2121 requires the Board to apportion the cost of the Great Sacandaga Lake Reservoir among the State of New York, public corporations and parcels of real estate in proportion to the amount of benefit that will inure to each.

33. The Board has apportioned the entire (100%) cost to five counties of New York State, to wit: Albany (38.38%), Rensselaer (17.55%), Saratoga (33.69%), Washington (3.85%) and Warren (6.53%).

34. As stated above, the Board has apportioned no amount to the State of New York. While the Board apparently considered and disregarded as negligible the flow control benefit to the State's canal system, it ignored the benefit the State derives from flood protection to its infrastructure as well as other benefits the State as a whole derives such as navigation, recreation, flood protection etc.

35. While the Board purportedly has identified multiple properties in the five counties which it says are located in the hypothetical flood plain, it has failed to determine the flood protection benefit to "each such parcel" as required by the §15-2121 (2) of ECL. In its memorandum to the Board dated December 1, 2009 for the December 8, 2009 meeting, staff recommended estimating "... the value of the potential property losses from flooding realized by each of the various towns, cities, cities and villages...." The apportionment failed to follow this recommendation, and made no estimate of the damages to the municipalities. As importantly, the apportionment failed to make use of available information and data relating to the actual potential damage to individual properties, with staff stating that "...breaking out a flood benefit to individual parcels may fail to capture the totality of such benefit and will fail to spread the value of such benefit to the wider group who derive a benefit." This approach, of course, is in direct contradiction and violation of the statutory requirement that the apportionment be "...in proportion to the amount of benefit which will inure to each public corporation and parcel of real estate by reason of such reservoir." There is no explanation of what staff means by this reference to "failure to capture" the "totality" of such benefit. It appears it is an excuse to avoid assessing the benefit to each parcel of real property, as enjoined by the statute.

36. Methodology exists and is available to the Board to properly assess flood protection benefits to individual parcels of real estate. The Gomez and Sullivan Report in fact made such a calculation for the Board in 2003 (Gomez and Sullivan P 7-12, P 15-16, PP47-71).

This information is available to the Board and can and must be used by the Board to be in compliance with the statute.

37. In addition to failing to identify the individual parcels of real estate located in the 100 year flood plain and determine the amount of benefits each receives by the existence of the Great Sacandaga Lake Reservoir, the Board has failed to identify, assess and apportion the benefit to parcels of real estate located outside of the five counties but within the entire length at the hypothetical 100 year flood plain of the Hudson River without the existence of the Reservoir.

38. The Petition for the establishment of the District in 1925 identifies benefits of the Reservoir accruing to Public Corporations and parcels of real estate which are located outside of the regulatory boundaries of HRBRRD, and specifically along the Hudson River south of Troy to the Atlantic Ocean.

39. The Petition states that the River is navigable and extensively used commercially for the transportation of property and persons from the City of Troy to the City of New York.

40. The Petition also states that during springtime excess freshets overflow the banks of the River and cause extensive damage.

41. The Petition also states that floods damage the railroads constructed along the banks of the River.

42. The Petition states that various municipalities located along the River from the Village of Corinth to the City of New York use the River for sewage disposal, and that at low flow, the River can become unsanitary and a menace to public health as a result of the lack of water to assimilate the waste.

43. Clearly, the Reservoir was constructed to address the damages and conditions that existed and are described in the Petition, and clearly all of the public corporations and real estate parcels that were adversely affected by the problems described in the Petition were and are beneficiaries of the construction and existence of the Reservoir.

44. The Board has failed and refused to consider any of the benefits of the existence of the Reservoir discussed in the Petition other than the flood protection benefit. Indeed, in its December 1, 2009 memorandum to the Board, staff recommended to the Board that the assessment "... would be imposed on only those beneficiaries who realize a flood benefit to the exclusion of flow augmentation beneficiaries such a those involved in whitewater recreation and wastewater assimilation." There is simply no authority in the statute for the Board to choose among classes of benefit and favor some over others and doing so is illegal, arbitrary, capricious. and an abuse of discretion.

45. The Board has failed and refused to consider public corporations and parcels of real estate benefited by the Reservoir, including the following classes of beneficiaries:

> a. each and every town, village, city, county and the state with infrastructure located within the flood plain of the Hudson River from the Conklinville Dam to the outlet of the River at the City of New York;
>
> b. each and every parcel of real property located within the flood plain of the Hudson River from the Conklinville Dam to New York City;
>
> c. each and every waste water treatment plant which discharges treated water into the Hudson River;
>
> d. railroads with rail lines located in the flood plain of the Hudson River between the Conklinville Dam and New York City;
>
> e. each parcel of real estate which receives electricity generated by the hydropower facilities located on the Hudson River;
>
> f. each and every town, village, city, county and entity which drains water from the Hudson River for use as a public water supply or irrigation or any other purpose, from the Conklinville Dam to New York City.
>
> g. New York State.

46. The Board has failed and refused to apportion costs to recipients of benefits, as defined in ECL §15-2101(3), as follows:

> 3. "Benefit or benefits" shall be interpreted to include benefits to real estate, public or private, to municipal water supply, to navigation, to agriculture and to industrial and general welfare by reason of the maintenance and operation of a regulating reservoir, whether such benefit shall inure to a person, a public corporation or the state. In the event that any regulating reservoir operates to relieve the state of any obligation by

> reason of diversion of the water of any river for canal purposes, the state, to the extent that the maintenance and operation of such reservoir may accomplish such relief, shall be deemed to have received benefit there from.

47. The Gomez and Sullivan study, commissioned by the Board, identified, quantified and apportioned the benefits of the Reservoir to the recipients. That study apportioned only 54.14% of benefit to flood protection, which is the only benefit category that was considered by the Board. (Exhibit G, p. 19).

48. The Gomez and Sullivan Report identified nine benefits resulting from the Reservoir in addition to flood protection, the only benefit considered by the Board. (Page 15 et seq).

49. The Gomez and Sullivan Report identified increased real estate values for lakeshore property, but did not attempt to quantify it (page 15, par. 4.1).

50. The Gomez and Sullivan Report identified lake recreation as a benefit, and referred to the "DeSeve Report" for its quantification (page 15, par. 4.2).

51. The Gomez and Sullivan Report identified hydroelectric power generation as a benefit and quantified it. (page 15, par. 4.3). While the U. S. Court of Appeals decision prevents the Board from assessing the power companies listed directly, each of the properties which receives electric power generated by these facilities (i.e. the customers)

are beneficiaries of the Reservoir as much as the power companies are. The customers' shares of this benefit can be recovered through the companies.

52. The Gomez and Sullivan Report identifies and quantifies flood protection benefit by municipality, at least down to the southern boundaries of Albany and Rensselaer Counties. (page 15-16, par 4.4). The methodology of quantifying benefit to each parcel within these municipalities is set forth by the Report, and should be used by the Board to properly carry out its responsibility of apportioning benefits to individual properties, both above and below the Albany/Rensselaer boundaries.

53. The Gomez and Sullivan Report identifies waste assimilation as a benefit of the Reservoir, and quantifies it by scientific methodology (page 17, par 4.5). In addition, the Board has the benefit of the 1984 Malcolm Pirnie Report, "Study of Impacts of Hudson River Flow Regulation." (Exhibit H) That Report discusses multiple municipal waste treatment plants as well as 65 industrial waste water facilities which were discharging waste into the Hudson River as of May 1984. That study was prepared to examine the impact of a proposed reduction of the minimum reservoir level. It studies and quantifies by scientific measurement the effect of a reduction in flow on industrial and municipal waste treatment facilities. This methodology is available to identify the impact to those facilities of 100 year drought conditions as they would occur without the Great Sacandaga Reservoir. The benefit to these facilities and their owners must be identified and quantified.

54. The Gomez Report identified White Water recreation, downstream water recreation, downstream fisheries enhancement and navigation as benefits.

55. The Gomez and Sullivan Report identified benefits to water supply systems, but restricted its study to north of the Albany County line. The Malcolm Pirnie study however extended its study to public water systems and industrial water users along the entire length of the Hudson River. Its study was limited to the impact of a reduction in lake level, and didn't address what would exist if there were no reservoir. It is clear that, without the Reservoir, there would be a severe impact on these facilities in times of drought and low flow. The importance of the Reservoir to lower Hudson River water systems is dramatized by the drought which occurred in 1995. The Reservoir released additional flow to help prevent and reverse a salt water front which threatened water supplies in Poughkeepsie. (See Exhibit "I" – News articles) Clearly the flow control and water impoundment afforded by the Reservoir benefits these properties. The Board has the ability to identify these facilities' benefit and quantify it and apportion the cost accordingly.

56. The failure to consider and apportion costs to all these categories of benefit and to all the public corporations and parcels of real estate benefited thereby is arbitrary and capricious and is not in compliance with the requirements of the statute.

METHOD OF APPORTIONMENT IS FLAWED

57. Using the ArcGIS system and assessment information, the Board totaled the assessed valuations of all parcels in Saratoga County located wholly or in part within a hypothetical 100 flood plain of the Hudson River, without the Reservoir.

58. Using the ArcGIS system, the Boards staff created a mapping of the length of the Hudson River from the Conklinville Dam to the southern boundaries of Albany and Rensselaer County, and superimposed overlays of the hypothetical 100 year flood plain of the River without the presence of the dam, and superimposed tax mapping to show the parcels of land wholly or partially within the flood plain.

59. An examination of the data and maps created by this method reveals that, in a high percentage of these parcels, most of the value of the parcel, including land and improvements, is located outside the flood plain, and those values bear no relationship to an identification, quantification or apportionment of any benefit to the parcel.

60. In fact, an examination of the mapping of the Saratoga County portion reveals that, of 1372 parcels with structures shown, in the case of 481 parcels, or 35%, the structures were located outside of the flood plain, with the result that a substantial portion of the total assessed valuation of Saratoga County parcels would not be affected by the absence of the dam, as they are located outside the 100 year flood plain. (Attached as Exhibit B is a list of the towns, villages and the City of Mechanicville, with the count of parcels

whose major structures are in and out of the flood plain). Exhibits B-1 through B-10 are hard copies of the ArcGIS overlay maps for representative portions of the Saratoga County bank of the Hudson River which demonstrate how little of these properties is located in the flood plain.

61. In addition, large portions of parcels which are not improved by structures are located outside of the flood plain. Attached hereto as Exhibits C-1 – C-3 are hard copies of the Board's ArcGIS overlay mapping which show examples of the above, including the lands of the Saratoga National Cemetery shown on Exhibit C-1 (tax parcel 195.-1-21.11) which is 235 acres assessed at $1,224,000, only a very small portion of which is located within the flood plain, and including the Saratoga Battlefield Park shown on Exhibit C-2 (tax parcel 221.-1-1) which is 2,327.36 acres assessed at $3,500,000, only a very small part of which is located in the flood plain. On each of these exhibits, large neighboring parcels are shown which are similarly included in the Board's "count".

62. Further, included in those parcels with structures which are located outside the 100 year flood plain are major industrial/commercial facilities. Exhibit D is a list of some of the larger assessed valuations included in the Board's apportionment calculations. The total assessed valuation of these properties alone is $164,811,046, or 11.7% of the assessed valuations of Saratoga County properties included by the Board in its calculation. Exhibits D-1 through D-8 depict some of these facilities as shown on the Board's ArcGIS overlay mapping. There is no demonstrable relation of the values of these parcels to a benefit resulting from the Reservoir.

63. Further, the Board included in the assessed valuation of Saratoga County the value of 18 hydroelectric facilities located on the Hudson River in Saratoga County. The United States Circuit Court of Appeals determined in Albany Engineering v. FERC that no benefit assessment can be made against these facilities. Exhibit E shows the assessed valuation of the facilities which are in effect exempt from paying benefit assessments as a result of the Court's decision. It is arbitrary and capricious to include these values to calculate a proportionate share allocable to Saratoga County as a benefit assessment is not available from them. The total assessed value of these facilities is $449,403,800, or 31.9% of Saratoga County's total.

64. Further, the Board included the value of New York State properties located wholly or partially within the 100 year hypothetical flood zone. The Board has failed and refused to charge any amount of benefit to the State (although required to do so by the statute), but has included $11,365,601 of assessed value of State properties in Saratoga County's share of the apportionment calculation (Exhibit F). This sum includes the State's Peebles Island facility in Waterford which is located outside of the flood zone. (Exhibit D-8)

65. ECL §15-2101(4) requires the Board to "view" the premises and public corporations to be benefited. The Board has failed and refused to comply with this statutory requirement.

66. Had the Board complied with the requirement that it view the premises, it would have immediately recognized the lack of any flood control benefit to the above mentioned parcels, and could not have reasonably included them in a calculation of apportionment of benefits.

67. The methodology to identify parcels which benefit from flood control afforded by the Reservoir, and to quantify the benefit, is available to the Board, as it was done in the Gomez and Sullivan Report. Had the Board viewed the premises in conjunction with its overlay mapping, it would have recognized that substantial portions of the value of the properties are not in the flood plain, and are not benefited by the Reservoir, and the resulting extreme reduction in total assessed value would certainly reduce the flood prevention benefit apportioned on account of these properties to the Complainant County of Saratoga. Utilizing the Gomez and Sullivan methodology, the actual potential damage to each parcel can be determined, and a proper assessment and apportionment can be made.

68. The method utilized by the Board does not comply with the requirements of ECL §15-2121, and bears no logical relationship to the identification, quantification, and apportionment of benefits of the Great Sacandaga Reservoir.

69. The method utilized by the Board is arbitrary and capricious and lacks any rational basis in law or in fact.

THE BOARD HAS ABDICATED ITS STATUTORY DUTY

70. In its memorandum dated January 7, 2010 for the January 12, 2010 Board Meeting, District Staff stated that "The 'market value' of properties in the 'without GSL' 100-year floodplain serves as the basis for the calculation of the proportion of benefits derived by each."

71. As demonstrated above, this calculation is flawed and irrational due to the fact that huge portions of the value of these properties are outside the flood plain, and due to the fact that it relates only to one of the multiple benefits of the Reservoir, that of flood control.

72. The Board's counsel's memorandum dated January 7, 2010 totally ignores apportionment of benefits to each parcel, as required by ECL §15-2121, but rather advises the Board that "...by grouping the towns cities, villages and individual parcels of real estate within each such public corporations, the potential disparate treatment of one individual parcel, neighborhood or municipality when compared to others diminishes." (p. 1, fourth paragraph). There is no explanation of the meaning or basis of this comment.

73. Counsel goes on to state "the documents supporting staff's recommended apportionment against the counties includes information upon which the counties could

rely to pass-through (sic) such apportionment to the constituent cities, towns and villages within such county." (Leslie memo, page 1, last paragraph).

74. This statement is totally without basis in the law. The counties have absolutely no authority to pass on any portion of benefit assessment to any village, city or towns, nor to any parcels of land. To "pass-through" the Board's assessment to less than all of Saratoga County would require formation of a taxing district. County Law Article 5.A authorizes counties to form only water, sewer, drainage and refuse districts. No authority is granted for a "pass through" district, and none is needed. If, as the Board's counsel says, the information is available for the counties to apportion benefits to the cities, towns and villages, then it is available to the Board to do so. Any information that is available to the counties is available to the Board. The difference is that the authority and responsibility to use the information and make a proper assessment and apportionment is given to the Hudson River Black River Regulating District Board by ECL §15-2121, and not to the counties.

75. The Board's apportionment of benefits to the Complainant County of Saratoga is an abdication of its duty under ECL §15-2121 to "...apportion such cost, less the amount which may be chargeable to the state, among the public corporations and parcels of real estate benefited, in proportion to the amount of benefit which will inure to each such public corporation and parcel of real estate by reason of such reservoir." (ECL §15-2121(2)).

DENIAL OF EQUAL PROTECTION

76. As set forth above; the Board has failed and refused to apportion benefit costs to a multitude of public corporations and parcels of real estate which are benefited by the various benefits afforded by the Reservoir.

77. This failure and refusal deprives the Complainant County of Saratoga and the citizens, residents and taxpayers thereof of equal protection of the law. The Board has selected only a portion of those benefited and required them to bear the entire burden of the cost of the benefit.

78. Even within the county, the apportionment of benefit costs to the Complainant County of Saratoga as a whole imposes the county's assessment on all of the citizens, residents and taxpayers of the county, without discriminating between those who derive a direct benefit from the Reservoir by virtue of living and owning property within or in close proximity to the Hudson River and those who live remotely from the River, and do not derive a direct benefit.

79. The population of Saratoga County was 200,635 as of the 2000 census. Of those, only 70,911 reside in the river towns of Hadley, Corinth, Moreau, Northumberland, Saratoga, Stillwater, Halfmoon and Waterford and the City of Mechanicville. A large portion of the river towns' population do not reside or own property in the flood plain.

80. By failing to apportion benefit costs to each parcel benefited, as required by the statute, and instead apportioning cost to the County as a whole, the Board is denying equal protection of the law to those residents of the County not benefited.

REQUESTED MODIFICATIONS

As a result of the foregoing, the Complainant County of Saratoga requests that the Board modify the apportionment of the costs of the Great Sacandaga Reservoir as follows:

1. Withdraw the apportionment, on the grounds that it does not comply with ECL §15-2121 nor with its own Regulation NYCRR §606.126, and that it is arbitrary and capricious and without rational basis, and deprives citizens of the County of Saratoga of equal protection of the law.

2. Identify the beneficiaries of the following benefits of the Great Sacandaga Lake:

    a. Increased property values for lakeshore property;

    b. Lake recreation;

    c. Hydroelectric power generation;

    d. Flood protection;
        1. public corporation and infrastructure
        2. private property

    e. Wastewater assimilation;
        1. public waste treatment facility
        2. industrial waste treatment facilities

    f. White water recreation;

    f. Water supply protection;
        1. public water supply systems
        2. industrial and other water systems

g. Downstream r ecreation;

h. Downstream fisheries enhancement and protection;

i. Commercial and Recreational navigation.

3. Identify the public corporations which are recipients of the above benefits and the benefit derived by each public corporation.

4. Identify each parcel of real estate which benefits from each of the above benefits, and the benefit derived by each parcel of real property.

5. Compute the value of each of the identified benefits to each of the identified beneficiaries.

6. Compute the amount chargeable to New York State for the benefit it derives from infrastructure protection, navigation enhancement, recreation enhancement, and the general health and welfare benefit to the residents of the state.

7. Apportion the cost of the expense of the Great Sacandaga Reservoir and the maintenance and operation thereof to New York State and to each benefited public corporation and parcel of real estate in proportion to the amount of benefit determined to inure to the state and to each such public corporation and parcel of real property by reason of such reservoir.

Respectfully submitted,

by _____

MARK M. RIDER, ESQ.
Saratoga County Attorney
Attorney for Respondents
40 McMaster Street
Ballston Spa, NY 12020
(518) 884-4770

VERIFICATION

STATE OF NEW YORK

ss.:

COUNTY OF SARATOGA

MARK M. RIDER, being duly sworn, deposes and says that he resides in the Saratoga County, New York, and that he is the County Attorney for the County of Saratoga; he is acquainted with the facts set forth in the foregoing Complaint and the said Complaint is true to the knowledge of deponent.

The source of deponent's information is the records of the County of Saratoga.

MARK M. RIDER

Sworn to before me this
23rd day of March, 2010.

Notary Public - State of New York
My Commission expires 3/20/14

Notary Public, State Of New York
Diane M. Armer
Regt# 01AR6142827
Qualified in Saratoga County
Commission Expires 03/20 14

In the Matter of the

COMPLAINT

and

DEMAND FOR MODIFICATION OF
THE COUNTY OF SARATOGA

of

The Apportionment of a Portion of the
Cost and Expense of the Great Sacandaga
Reservoir by the HUDSON RIVER BLACK
RIVER REGULATING DISTRICT

EXHIBITS TO COMPLAINT

HUDSON RIVER BLACK RIVER REGULATING DISTRICT
COUNTY OF ALBANY
STATE OF NEW YORK

In the Matter of the

COMPLAINT
and

DEMAND FOR MODIFICATION OF
THE COUNTY OF SARATOGA
of
The Apportionment of a Portion of the
Cost and Expense of the Great Sacandaga
Reservoir by the

HUDSON RIVER BLACK
RIVER REGULATING DISTRICT

COMPLAINT

The County of Saratoga, as a Public Corporation aggrieved by the apportionment to it of a portion of the total cost and expense of the Great Sacandaga Lake Reservoir by the Hudson River Black River Regulating District, as and for a complaint and demand for modification of said appropriation, sets forth the following.

1. The Complainant County of Saratoga is a municipal corporation of the State of New York, with offices located at 40 McMaster Street, Ballston Spa, New York.

2. The name and, address and telephone number of the representative of the Complainant is Mark M. Rider, Saratoga County Attorney, 40 McMaster Street, Ballston Spa, New York 12020 (518-884-4770).

3. On or about January 12, 2010, the Board of the Hudson River Black River Regulating District Board (hereinafter "the Board") made an "Apportionment of Operation and Maintenance Cost of the Great Sacandaga Lake Reservoir" (hereinafter "the Apportionment"), purportedly in compliance with New York State Environmental Conservation Law Section 15-2121.

4. By said Apportionment, the Board apportioned to Complainant County of Saratoga 33.69% of the operation and maintenance cost of the Great Sacandaga Lake Reservoir (hereinafter "the Costs"), and assessed to it the amount of $1,500,489.21 to be paid for the HRBRRD's fiscal year July 2009 – June 2010.

5. The said apportionment is unlawful, for the reasons that follow.

NO CHANGE IN THE EQUITABLE LIABILITY OF THE COUNTY

6. ECL §15-2121 (6) sets forth the statutory basis for the original apportionment of the Costs, which was accomplished by the Board in or around 1925.

7. In regards to the original apportionment, ECL §15-2121 (6) provides in pertinent part as follows:

> Such apportionment and determination, when finally made, also shall be deemed to fix and determine the apportionment and the basis of apportionment of all subsequent expenses to be incurred in the maintenance and operation of such reservoir, including the amount of a reasonable return to the state, if any, as provided for in title 21 of this article.

8. ECL §15-2121 (7) sets forth the statutory authorization for any subsequent apportionment, such as the January 12, 2010 apportionment.

9. Relative to subsequent apportionment, ECL §15-2121(7) provides in pertinent part as follows:

> If powers be developed after such apportionment has been made or if for any other reason any public corporation or any parcel of real estate becomes liable equitably for such subsequent expenses, a subsequent apportionment may be made in the same manner and subject to the same review as the original apportionment.

10. The said language requires that, before a new apportionment can be made, a public corporation must "become liable equitably" for subsequent expenses. Applying this language, a change in regard to the status of a public corporation must occur which makes it "become" liable for costs.

11. Indeed, the language of the original version of the current law even more specifically stated the preconditions to altering the apportionment, as follows:

> §461. Lands exempt and later liable to assessment. If any lands in any district organized under this article are not liable for assessment at the time of the creation of the reservoir, but afterwards during the period when such reservoir is being paid for become liable to assessment by reason of some change in condition or ownership, the benefits to such real estate shall thereupon be apportioned and the amount thereof assessed as other real estate in said district receiving equal benefits, and such added assessments shall be levied and collected as other assessments and paid into the funds of the district for the uses thereof.

> §462. Subsequent assessments. In case any real estate within the district is benefited, which for any reason was not assessed, or in case any public corporation or real estate of any person shall receive benefits from the improvement in any district organized under the article to a degree not considered in the original apportionment of benefits the board shall make a reapportionment of such benefits, or in case the board find it necessary subsequent to the time when the first assessments are made to take or damage any additional property, the board shall levy and assess the expense thereof. Proceedings outline in this article for apportionment of benefits and levy, assessment and collection of the cost and expenses of the improvement, shall in all matters be conformed with, or the board may at its discretion make any suitable settlement for such benefit, damage or property taken. (emphasis added Chapter 622 Laws of 1915: Sections 461 and 462 of the Conservation Law)

12. While the later version of the law was streamlined, the requirement remains that some change in the benefits received by a public corporation is required before its portion of cost can be changed.

13. The original apportionment determined that the Complainant County of Saratoga, a public corporation, was not equitably liable for any costs of the Great Sacandaga Lake Reservoir.

14. There has been no change to the status of the Complainant County of Saratoga that alters the equitable liability of the Complainant County of Saratoga from the original determination of the Board of no liability.

15. The statutory condition precedent to the Board making a subsequent apportionment to include the Complainant County of Saratoga has not occurred, and the apportionment is therefore illegal.

FAILURE TO APPORTION COST TO THE STATE

16. ECL §15-2121(2) requires the Board to determine the portion of the Costs chargeable to the State of New York, and to reduce the total costs by the resultant amount before apportioning the remaining costs among the public corporations and parcels of real estate benefited by the Great Sacandaga Lake Reservoir.

17. A quick glance at the map of Saratoga County would have revealed to the Board that, in Saratoga County alone, New York State Route 9N has a bridge crossing the Hudson River and its flood plain near Hadley, and continues adjacent to the River for several miles south to Corinth; that Route 87 has a bridge crossing over the Hudson River in the Town of Moreau; that New York Sate Route 9 has a bridge over the Hudson River at South Glens Falls; that New York State Route 4 has a bridge over the Hudson River north of Schuylerville, and continues south along the River all the way through Waterford to a bridge over the Hudson River to the City of Troy with much of that distance being in the 100 year flood plain of the Hudson River. New York State Route 129 crosses the Hudson River by a bridge at Schuylerville. New York State Route 67 crosses the Hudson River by a bridge at Mechanicville. New York State Route 4 crosses the Hudson by a bridge in Waterford. All of these highways receive a flood protection benefit not considered by the Board.

18. In addition, the State of New York Canal Corporation has a series of locks and facilities in the Hudson River which receive a flood protection benefit. (The Gomez and Sullivan report, cited in counsel's memorandum to the Board dated December 29, 2009, considered only the flow control benefit related to the canal, not flood protection. Gomez and Sullivan Engineers, P.C., "Final Report, Hudson River Flow Regulation Benefit Study, July 2003, Exhibit G).

19. In addition, the State maintains a State Emergency Management Administration (SEMA) which responds to natural disasters such as floods. If the Reservoir did not exist, in fact the cost of a 2, 4, 10, 50 or 100 year flood would ultimately be a state cost through SEMA assistance. The State thereby generally benefits from flood control of the Reservoir, by the reduction in severity and frequency of floods.

20. In addition, the State benefits from the recreational aspects of the Reservoir, both on Sacandaga Lake, in the white water rapids downstream of the Conklinwille Dam, and throughout the Hudson River to the Atlantic. The benefit to commercial and pleasure navigation below and above Albany are also a general benefit to the State.

21. While these benefits are duly listed in the Gomez and Sullivan Report commissioned and received by the Board, no attempt was made to include them in the apportionment.

22. The Board has failed to make any required determination of the amount of costs attributable to the State, and its apportionment does not reduce the total cost by an amount attributable to the State, as required by ECL §15-2121(2).

FAILURE TO DETERMINE BENEFIT TO COMPLAINANT

23. ECL §15-2121(2) requires the Board to determine the "...amount of benefit which will inure to each public corporation..." by reason of the Reservoir.

24. The methodology of the Board in apportioning cost to the Complainant County of Saratoga consisted of totaling the equalized assessed valuations of parcels of real property partially or wholly within the hypothetical 100 year flood plain of the Hudson River without the Reservoir within Saratoga County, and dividing it by the total equalized assessed valuations of parcels of real property partially or wholly within the hypothetical 100 year flood plain of the Hudson River within Washington, Warren, Saratoga, Rensselaer and Albany Counties.

25. The Board's methodology did not in any manner identify, consider, calculate or determine any benefit derived by the Complainant County of Saratoga by reason of the Reservoir.

26. The Board apparently determined that "...flood protection is the most direct and clearly defined benefit...." and failed to identify, quantify or evaluate any other benefit of the Reservoir. (See "Memorandum" dated 1/7/2010).

27. The Board knew or had reason to know that there are additional benefits created by the construction of the Reservoir, including:

- Increased Real Estate Values for Lakeshore Property
- Lake Recreation
- Hydroelectric Power Generation
(- Flood Protection)
- Waste Assimilation
- Whitewater Recreation
- Water Supply
- Downstream Water Recreation
- Downstream Fisheries Enhancement
- Navigation

The listed benefits are identified in the "Hudson River Flow Regulation Benefit Study" prepared for HRBRRD by Gomez and Sullivan Engineers, P.C. and dated July 2003, at Page 2. (Exhibit G).

28. The Board apparently concluded that the Complainant County of Saratoga benefited by avoiding loss of public infrastructure, but failed to identify any infrastructure of the County that would be lost, and failed to evaluate the cost of damage thereto.

29. The sole criteria used by HRBBRD to quantify a benefit to the Complainant County of Saratoga is the assessed valuation of the parcels owned by various individuals and entities which are located partially or wholly within a hypothetical 100 year flood plain of a hypothetical Hudson River without the Reservoir, as shown on the ArcGIS overlay mapping system.

30. None of the said properties are owned by the Complainant County of Saratoga, and their assessed value is not relevant to any benefit accruing to the Complainant by virtue of the Reservoir.

31. There is no reasonable, rational or legal basis for the apportionment to the County of Saratoga of 33.69% of the cost of the Great Sacandaga Lake Reservoir based on the methodology used by the Board.

FAILURE TO APPORTION COST TO OTHER BENEFICIARIES

32. ECL §15-2121 requires the Board to apportion the cost of the Great Sacandaga Lake Reservoir among the State of New York, public corporations and parcels of real estate in proportion to the amount of benefit that will inure to each.

33. The Board has apportioned the entire (100%) cost to five counties of New York State, to wit: Albany (38.38%), Rensselaer (17.55%), Saratoga (33.69%), Washington (3.85%) and Warren (6.53%).

34. As stated above, the Board has apportioned no amount to the State of New York. While the Board apparently considered and disregarded as negligible the flow control benefit to the State's canal system, it ignored the benefit the State derives from flood protection to its infrastructure as well as other benefits the State as a whole derives such as navigation, recreation, flood protection etc.

35. While the Board purportedly has identified multiple properties in the five counties which it says are located in the hypothetical flood plain, it has failed to determine the flood protection benefit to "each such parcel" as required by the §15-2121 (2) of ECL. In its memorandum to the Board dated December 1, 2009 for the December 8, 2009 meeting, staff recommended estimating "... the value of the potential property losses from flooding realized by each of the various towns, cities, cities and villages...." The apportionment failed to follow this recommendation, and made no estimate of the damages to the municipalities. As importantly, the apportionment failed to make use of available information and data relating to the actual potential damage to individual properties, with staff stating that "...breaking out a flood benefit to individual parcels may fail to capture the totality of such benefit and will fail to spread the value of such benefit to the wider group who derive a benefit." This approach, of course, is in direct contradiction and violation of the statutory requirement that the apportionment be "...in proportion to the amount of benefit which will inure to each public corporation and parcel of real estate by reason of such reservoir." There is no explanation of what staff means by this reference to "failure to capture" the "totality" of such benefit. It appears it is an excuse to avoid assessing the benefit to each parcel of real property, as enjoined by the statute.

36. Methodology exists and is available to the Board to properly assess flood protection benefits to individual parcels of real estate. The Gomez and Sullivan Report in fact made such a calculation for the Board in 2003 (Gomez and Sullivan P 7-12, P 15-16, PP47-71).

This information is available to the Board and can and must be used by the Board to be in compliance with the statute.

37. In addition to failing to identify the individual parcels of real estate located in the 100 year flood plain and determine the amount of benefits each receives by the existence of the Great Sacandaga Lake Reservoir, the Board has failed to identify, assess and apportion the benefit to parcels of real estate located outside of the five counties but within the entire length at the hypothetical 100 year flood plain of the Hudson River without the existence of the Reservoir.

38. The Petition for the establishment of the District in 1925 identifies benefits of the Reservoir accruing to Public Corporations and parcels of real estate which are located outside of the regulatory boundaries of HRBRRD, and specifically along the Hudson River south of Troy to the Atlantic Ocean.

39. The Petition states that the River is navigable and extensively used commercially for the transportation of property and persons from the City of Troy to the City of New York.

40. The Petition also states that during springtime excess freshets overflow the banks of the River and cause extensive damage.

41. The Petition also states that floods damage the railroads constructed along the banks of the River.

42. The Petition states that various municipalities located along the River from the Village of Corinth to the City of New York use the River for sewage disposal, and that at low flow, the River can become unsanitary and a menace to public health as a result of the lack of water to assimilate the waste.

43. Clearly, the Reservoir was constructed to address the damages and conditions that existed and are described in the Petition, and clearly all of the public corporations and real estate parcels that were adversely affected by the problems described in the Petition were and are beneficiaries of the construction and existence of the Reservoir.

44. The Board has failed and refused to consider any of the benefits of the existence of the Reservoir discussed in the Petition other than the flood protection benefit. Indeed, in its December 1, 2009 memorandum to the Board, staff recommended to the Board that the assessment "... would be imposed on only those beneficiaries who realize a flood benefit to the exclusion of flow augmentation beneficiaries such a those involved in whitewater recreation and wastewater assimilation." There is simply no authority in the statute for the Board to choose among classes of benefit and favor some over others and doing so is illegal, arbitrary, capricious. and an abuse of discretion.

45. The Board has failed and refused to consider public corporations and parcels of real estate benefited by the Reservoir, including the following classes of beneficiaries:

> a. each and every town, village, city, county and the state with infrastructure located within the flood plain of the Hudson River from the Conklinville Dam to the outlet of the River at the City of New York;
>
> b. each and every parcel of real property located within the flood plain of the Hudson River from the Conklinville Dam to New York City;
>
> c. each and every waste water treatment plant which discharges treated water into the Hudson River;
>
> d. railroads with rail lines located in the flood plain of the Hudson River between the Conklinville Dam and New York City;
>
> e. each parcel of real estate which receives electricity generated by the hydropower facilities located on the Hudson River;
>
> f. each and every town, village, city, county and entity which drains water from the Hudson River for use as a public water supply or irrigation or any other purpose, from the Conklinville Dam to New York City.
>
> g. New York State.

46. The Board has failed and refused to apportion costs to recipients of benefits, as defined in ECL §15-2101(3), as follows:

> 3. "Benefit or benefits" shall be interpreted to include benefits to real estate, public or private, to municipal water supply, to navigation, to agriculture and to industrial and general welfare by reason of the maintenance and operation of a regulating reservoir, whether such benefit shall inure to a person, a public corporation or the state. In the event that any regulating reservoir operates to relieve the state of any obligation by

> reason of diversion of the water of any river for canal purposes, the state, to the extent that the maintenance and operation of such reservoir may accomplish such relief, shall be deemed to have received benefit there from.

47. The Gomez and Sullivan study, commissioned by the Board, identified, quantified and apportioned the benefits of the Reservoir to the recipients. That study apportioned only 54.14% of benefit to flood protection, which is the only benefit category that was considered by the Board. (Exhibit G, p. 19).

48. The Gomez and Sullivan Report identified nine benefits resulting from the Reservoir in addition to flood protection, the only benefit considered by the Board. (Page 15 et seq).

49. The Gomez and Sullivan Report identified increased real estate values for lakeshore property, but did not attempt to quantify it (page 15, par. 4.1).

50. The Gomez and Sullivan Report identified lake recreation as a benefit, and referred to the "DeSeve Report" for its quantification (page 15, par. 4.2).

51. The Gomez and Sullivan Report identified hydroelectric power generation as a benefit and quantified it. (page 15, par. 4.3). While the U. S. Court of Appeals decision prevents the Board from assessing the power companies listed directly, each of the properties which receives electric power generated by these facilities (i.e. the customers)

are beneficiaries of the Reservoir as much as the power companies are. The customers' shares of this benefit can be recovered through the companies.

52. The Gomez and Sullivan Report identifies and quantifies flood protection benefit by municipality, at least down to the southern boundaries of Albany and Rensselaer Counties. (page 15-16, par 4.4). The methodology of quantifying benefit to each parcel within these municipalities is set forth by the Report, and should be used by the Board to properly carry out its responsibility of apportioning benefits to individual properties, both above and below the Albany/Rensselaer boundaries.

53. The Gomez and Sullivan Report identifies waste assimilation as a benefit of the Reservoir, and quantifies it by scientific methodology (page 17, par 4.5). In addition, the Board has the benefit of the 1984 Malcolm Pirnie Report, "Study of Impacts of Hudson River Flow Regulation." (Exhibit H) That Report discusses multiple municipal waste treatment plants as well as 65 industrial waste water facilities which were discharging waste into the Hudson River as of May 1984. That study was prepared to examine the impact of a proposed reduction of the minimum reservoir level. It studies and quantifies by scientific measurement the effect of a reduction in flow on industrial and municipal waste treatment facilities. This methodology is available to identify the impact to those facilities of 100 year drought conditions as they would occur without the Great Sacandaga Reservoir. The benefit to these facilities and their owners must be identified and quantified.

54. The Gomez Report identified White Water recreation, downstream water recreation, downstream fisheries enhancement and navigation as benefits.

55. The Gomez and Sullivan Report identified benefits to water supply systems, but restricted its study to north of the Albany County line. The Malcolm Pirnie study however extended its study to public water systems and industrial water users along the entire length of the Hudson River. Its study was limited to the impact of a reduction in lake level, and didn't address what would exist if there were no reservoir. It is clear that, without the Reservoir, there would be a severe impact on these facilities in times of drought and low flow. The importance of the Reservoir to lower Hudson River water systems is dramatized by the drought which occurred in 1995. The Reservoir released additional flow to help prevent and reverse a salt water front which threatened water supplies in Poughkeepsie. (See Exhibit "I" – News articles) Clearly the flow control and water impoundment afforded by the Reservoir benefits these properties. The Board has the ability to identify these facilities' benefit and quantify it and apportion the cost accordingly.

56. The failure to consider and apportion costs to all these categories of benefit and to all the public corporations and parcels of real estate benefited thereby is arbitrary and capricious and is not in compliance with the requirements of the statute.

METHOD OF APPORTIONMENT IS FLAWED

57. Using the ArcGIS system and assessment information, the Board totaled the assessed valuations of all parcels in Saratoga County located wholly or in part within a hypothetical 100 flood plain of the Hudson River, without the Reservoir.

58. Using the ArcGIS system, the Boards staff created a mapping of the length of the Hudson River from the Conklinville Dam to the southern boundaries of Albany and Rensselaer County, and superimposed overlays of the hypothetical 100 year flood plain of the River without the presence of the dam, and superimposed tax mapping to show the parcels of land wholly or partially within the flood plain.

59. An examination of the data and maps created by this method reveals that, in a high percentage of these parcels, most of the value of the parcel, including land and improvements, is located outside the flood plain, and those values bear no relationship to an identification, quantification or apportionment of any benefit to the parcel.

60. In fact, an examination of the mapping of the Saratoga County portion reveals that, of 1372 parcels with structures shown, in the case of 481 parcels, or 35%, the structures were located outside of the flood plain, with the result that a substantial portion of the total assessed valuation of Saratoga County parcels would not be affected by the absence of the dam, as they are located outside the 100 year flood plain. (Attached as Exhibit B is a list of the towns, villages and the City of Mechanicville, with the count of parcels

whose major structures are in and out of the flood plain). Exhibits B-1 through B-10 are hard copies of the ArcGIS overlay maps for representative portions of the Saratoga County bank of the Hudson River which demonstrate how little of these properties is located in the flood plain.

61. In addition, large portions of parcels which are not improved by structures are located outside of the flood plain. Attached hereto as Exhibits C-1 – C-3 are hard copies of the Board's ArcGIS overlay mapping which show examples of the above, including the lands of the Saratoga National Cemetery shown on Exhibit C-1 (tax parcel 195.-1-21.11) which is 235 acres assessed at $1,224,000, only a very small portion of which is located within the flood plain, and including the Saratoga Battlefield Park shown on Exhibit C-2 (tax parcel 221.-1-1) which is 2,327.36 acres assessed at $3,500,000, only a very small part of which is located in the flood plain. On each of these exhibits, large neighboring parcels are shown which are similarly included in the Board's "count".

62. Further, included in those parcels with structures which are located outside the 100 year flood plain are major industrial/commercial facilities. Exhibit D is a list of some of the larger assessed valuations included in the Board's apportionment calculations. The total assessed valuation of these properties alone is $164,811,046, or 11.7% of the assessed valuations of Saratoga County properties included by the Board in its calculation. Exhibits D-1 through D-8 depict some of these facilities as shown on the Board's ArcGIS overlay mapping. There is no demonstrable relation of the values of these parcels to a benefit resulting from the Reservoir.

63. Further, the Board included in the assessed valuation of Saratoga County the value of 18 hydroelectric facilities located on the Hudson River in Saratoga County. The United States Circuit Court of Appeals determined in Albany Engineering v. FERC that no benefit assessment can be made against these facilities. Exhibit E shows the assessed valuation of the facilities which are in effect exempt from paying benefit assessments as a result of the Court's decision. It is arbitrary and capricious to include these values to calculate a proportionate share allocable to Saratoga County as a benefit assessment is not available from them. The total assessed value of these facilities is $449,403,800, or 31.9% of Saratoga County's total.

64. Further, the Board included the value of New York State properties located wholly or partially within the 100 year hypothetical flood zone. The Board has failed and refused to charge any amount of benefit to the State (although required to do so by the statute), but has included $11,365,601 of assessed value of State properties in Saratoga County's share of the apportionment calculation (Exhibit F). This sum includes the State's Peebles Island facility in Waterford which is located outside of the flood zone. (Exhibit D-8)

65. ECL §15-2101(4) requires the Board to "view" the premises and public corporations to be benefited. The Board has failed and refused to comply with this statutory requirement.

66. Had the Board complied with the requirement that it view the premises, it would have immediately recognized the lack of any flood control benefit to the above mentioned parcels, and could not have reasonably included them in a calculation of apportionment of benefits.

67. The methodology to identify parcels which benefit from flood control afforded by the Reservoir, and to quantify the benefit, is available to the Board, as it was done in the Gomez and Sullivan Report. Had the Board viewed the premises in conjunction with its overlay mapping, it would have recognized that substantial portions of the value of the properties are not in the flood plain, and are not benefited by the Reservoir, and the resulting extreme reduction in total assessed value would certainly reduce the flood prevention benefit apportioned on account of these properties to the Complainant County of Saratoga. Utilizing the Gomez and Sullivan methodology, the actual potential damage to each parcel can be determined, and a proper assessment and apportionment can be made.

68. The method utilized by the Board does not comply with the requirements of ECL §15-2121, and bears no logical relationship to the identification, quantification, and apportionment of benefits of the Great Sacandaga Reservoir.

69. The method utilized by the Board is arbitrary and capricious and lacks any rational basis in law or in fact.

THE BOARD HAS ABDICATED ITS STATUTORY DUTY

70. In its memorandum dated January 7, 2010 for the January 12, 2010 Board Meeting, District Staff stated that "The 'market value' of properties in the 'without GSL' 100-year floodplain serves as the basis for the calculation of the proportion of benefits derived by each."

71. As demonstrated above, this calculation is flawed and irrational due to the fact that huge portions of the value of these properties are outside the flood plain, and due to the fact that it relates only to one of the multiple benefits of the Reservoir, that of flood control.

72. The Board's counsel's memorandum dated January 7, 2010 totally ignores apportionment of benefits to each parcel, as required by ECL §15-2121, but rather advises the Board that "...by grouping the towns cities, villages and individual parcels of real estate within each such public corporations, the potential disparate treatment of one individual parcel, neighborhood or municipality when compared to others diminishes." (p. 1, fourth paragraph). There is no explanation of the meaning or basis of this comment.

73. Counsel goes on to state "the documents supporting staff's recommended apportionment against the counties includes information upon which the counties could

rely to pass-through (sic) such apportionment to the constituent cities, towns and villages within such county." (Leslie memo, page 1, last paragraph).

74. This statement is totally without basis in the law. The counties have absolutely no authority to pass on any portion of benefit assessment to any village, city or towns, nor to any parcels of land. To "pass-through" the Board's assessment to less than all of Saratoga County would require formation of a taxing district. County Law Article 5.A authorizes counties to form only water, sewer, drainage and refuse districts. No authority is granted for a "pass through" district, and none is needed. If, as the Board's counsel says, the information is available for the counties to apportion benefits to the cities, towns and villages, then it is available to the Board to do so. Any information that is available to the counties is available to the Board. The difference is that the authority and responsibility to use the information and make a proper assessment and apportionment is given to the Hudson River Black River Regulating District Board by ECL §15-2121, and not to the counties.

75. The Board's apportionment of benefits to the Complainant County of Saratoga is an abdication of its duty under ECL §15-2121 to "...apportion such cost, less the amount which may be chargeable to the state, among the public corporations and parcels of real estate benefited, in proportion to the amount of benefit which will inure to each such public corporation and parcel of real estate by reason of such reservoir." (ECL §15-2121(2)).

DENIAL OF EQUAL PROTECTION

76. As set forth above; the Board has failed and refused to apportion benefit costs to a multitude of public corporations and parcels of real estate which are benefited by the various benefits afforded by the Reservoir.

77. This failure and refusal deprives the Complainant County of Saratoga and the citizens, residents and taxpayers thereof of equal protection of the law. The Board has selected only a portion of those benefited and required them to bear the entire burden of the cost of the benefit.

78. Even within the county, the apportionment of benefit costs to the Complainant County of Saratoga as a whole imposes the county's assessment on all of the citizens, residents and taxpayers of the county, without discriminating between those who derive a direct benefit from the Reservoir by virtue of living and owning property within or in close proximity to the Hudson River and those who live remotely from the River, and do not derive a direct benefit.

79. The population of Saratoga County was 200,635 as of the 2000 census. Of those, only 70,911 reside in the river towns of Hadley, Corinth, Moreau, Northumberland, Saratoga, Stillwater, Halfmoon and Waterford and the City of Mechanicville. A large portion of the river towns' population do not reside or own property in the flood plain.

80. By failing to apportion benefit costs to each parcel benefited, as required by the statute, and instead apportioning cost to the County as a whole, the Board is denying equal protection of the law to those residents of the County not benefited.

REQUESTED MODIFICATIONS

As a result of the foregoing, the Complainant County of Saratoga requests that the Board modify the apportionment of the costs of the Great Sacandaga Reservoir as follows:

1. Withdraw the apportionment, on the grounds that it does not comply with ECL §15-2121 nor with its own Regulation NYCRR §606.126, and that it is arbitrary and capricious and without rational basis, and deprives citizens of the County of Saratoga of equal protection of the law.

2. Identify the beneficiaries of the following benefits of the Great Sacandaga Lake:

   a. Increased property values for lakeshore property;

   b. Lake recreation;

   c. Hydroelectric power generation;

   d. Flood protection;
      1. public corporation and infrastructure
      2. private property

   e. Wastewater assimilation;
      1. public waste treatment facility
      2. industrial waste treatment facilities

   f. White water recreation;

   f. Water supply protection;
      1. public water supply systems
      2. industrial and other water systems

g. Downstream r ecreation;

h. Downstream fisheries enhancement and protection;

i. Commercial and Recreational navigation.

3. Identify the public corporations which are recipients of the above benefits and the benefit derived by each public corporation.

4. Identify each parcel of real estate which benefits from each of the above benefits, and the benefit derived by each parcel of real property.

5. Compute the value of each of the identified benefits to each of the identified beneficiaries.

6. Compute the amount chargeable to New York State for the benefit it derives from infrastructure protection, navigation enhancement, recreation enhancement, and the general health and welfare benefit to the residents of the state.

7. Apportion the cost of the expense of the Great Sacandaga Reservoir and the maintenance and operation thereof to New York State and to each benefited public corporation and parcel of real estate in proportion to the amount of benefit determined to inure to the state and to each such public corporation and parcel of real property by reason of such reservoir.

Respectfully submitted,

by _____

MARK M. RIDER, ESQ.
Saratoga County Attorney
Attorney for Respondents
40 McMaster Street
Ballston Spa, NY 12020
(518) 884-4770

VERIFICATION

STATE OF NEW YORK

ss.:

COUNTY OF SARATOGA

MARK M. RIDER, being duly sworn, deposes and says that he resides in the Saratoga County, New York, and that he is the County Attorney for the County of Saratoga; he is acquainted with the facts set forth in the foregoing Complaint and the said Complaint is true to the knowledge of deponent.

The source of deponent's information is the records of the County of Saratoga.

MARK M. RIDER

Sworn to before me this
23rd day of March, 2010.

Notary Public - State of New York
My Commission expires 3/20/14

Notary Public, State Of New York
Diane M. Armer
Regt# 01AR6142827
Qualified In Saratoga County
Commission Expires 03/20 14

In the Matter of the

COMPLAINT

and

DEMAND FOR MODIFICATION OF
THE COUNTY OF SARATOGA

of

The Apportionment of a Portion of the
Cost and Expense of the Great Sacandaga
Reservoir by the HUDSON RIVER BLACK
RIVER REGULATING DISTRICT

EXHIBITS TO COMPLAINT

Exhibit A

428, reargument denied 307 N.Y. 906, 123 N.E.2d 562, appeal dismissed 76 S.Ct. 780, 351 U.S. 922, 100 L.Ed. 1453.
Constitutional Law ⇐ 120

§ 15–2121. Apportionment of cost

1. If proceedings to review the final order of the board determining that such proposed reservoir shall be made have not been instituted within sixty days from the date of the filing of the same, or upon the filing of a modification thereof as directed by order of the court, the board shall, as soon thereafter as practicable, prepare an estimate of the total cost of such reservoir, including interest on certificates of indebtedness issued prior to the effective date of the Local Finance Law, or on notes, to the maturity thereof and compensation for real estate and all damages suffered by reason thereof and all expenses necessarily incurred or to be incurred in connection therewith, and make a complete and verified statement thereof.

2. The board shall then apportion such cost, less the amount which may be chargeable to the state, among the public corporations and parcels of real estate benefited, in proportion to the amount of benefit which will inure to each such public corporation and parcel of real estate by reason of such reservoir. Such apportionment shall be made in writing and shall show the name of each public corporation and a brief description of each parcel of real estate benefited; the name of the owner, or owners, of each such parcel of real estate, so far as can be ascertained; the proportion of such cost less the amount which may be chargeable to the state to be borne by each, expressed in decimals; and the amount to be paid by each such public corporation or the owner or owners of each such parcel of real estate.

3. Such amount shall be determined by multiplying the total cost less the amount which may be chargeable to the state by the decimal representing the proportion thereof to be borne by each public corporation or parcel of real estate.

4. The board, or a majority of the members thereof, before making such apportionment shall view the premises and public corporations benefited. Such apportionment shall be approved by the board and certified to the department for its approval. Upon the approval thereof by the department, the board shall cause a copy thereof to be served upon the chairman or other presiding officer of the county legislative body of each county, the mayor of each city, the supervisor of each town, and the mayor of each village, named in the apportionment, or if service cannot be had upon such chairman, mayor, or supervisor, then upon a member of the county legislative body of the county, an alderman of the city or member of the

governing board thereof, a member of the town board of the town, or a trustee of the village, and to be filed in the office of the county clerk of each county in which any public corporation or real property thereby affected is located. After such service and filing of such apportionment and determination, notice shall be given by the board, of publication of a time and place where the board will meet to hear any public corporation or person aggrieved by the same. The affidavit of the person serving or publishing such notice shall be evidence of such service or publication.

5. The board shall meet at the time and place specified and hear all persons and public corporations interested in or aggrieved by such apportionment and may approve of or modify the same. If such apportionment and determination be modified by the board it shall not become effective until approved by the department and a copy thereof served and filed in the same manner as upon the completion of the same in the first instance. Any public corporation or any person deeming it or himself aggrieved may upon notice to the board review the determination of the board in the same manner as a review is had of the determination of a board of assessors in making an assessment. Such apportionments as so modified and as further modified by any final judgment or order made in proceedings to review the same as herein provided shall be final and conclusive.

6. The amount of the total cost and expense of such reservoir and the maintenance and operation thereof including the amount of a reasonable return to the state as herein provided for, which each such public corporation and each such parcel of real estate is to pay and bear shall be based upon the proportion of cost as determined in the apportionment. If the total cost of such reservoir shall exceed the estimate made and apportioned as hereinbefore provided, the amount of such excess cost, less the amount which may be chargeable to the state, shall be apportioned among the public corporations and parcels of real estate benefited, by an additional apportionment to be made in the same manner and by the same procedure as the original apportionment, and shall be levied, assessed and collected in the manner provided in section 15–2123 hereof. Such apportionment and determination, when finally made, also shall be deemed to fix and determine the apportionment and the basis of apportionment of all subsequent expenses to be incurred in the maintenance and operation of such reservoir, including the amount of a reasonable return to the state, if any, as provided for in title 21 of this article.

7. If powers be developed after such apportionment has been made or if for any other reason any public corporation or any parcel of real estate becomes liable equitably for such subsequent expenses,

Ex A

Exhibit B

EXHIBIT B

ArcGIS Overlay Mapping of Saratoga County Properties
In 100 year Flood Plain of the Hudson River
If There Were No Great Sacandaga Reservoir

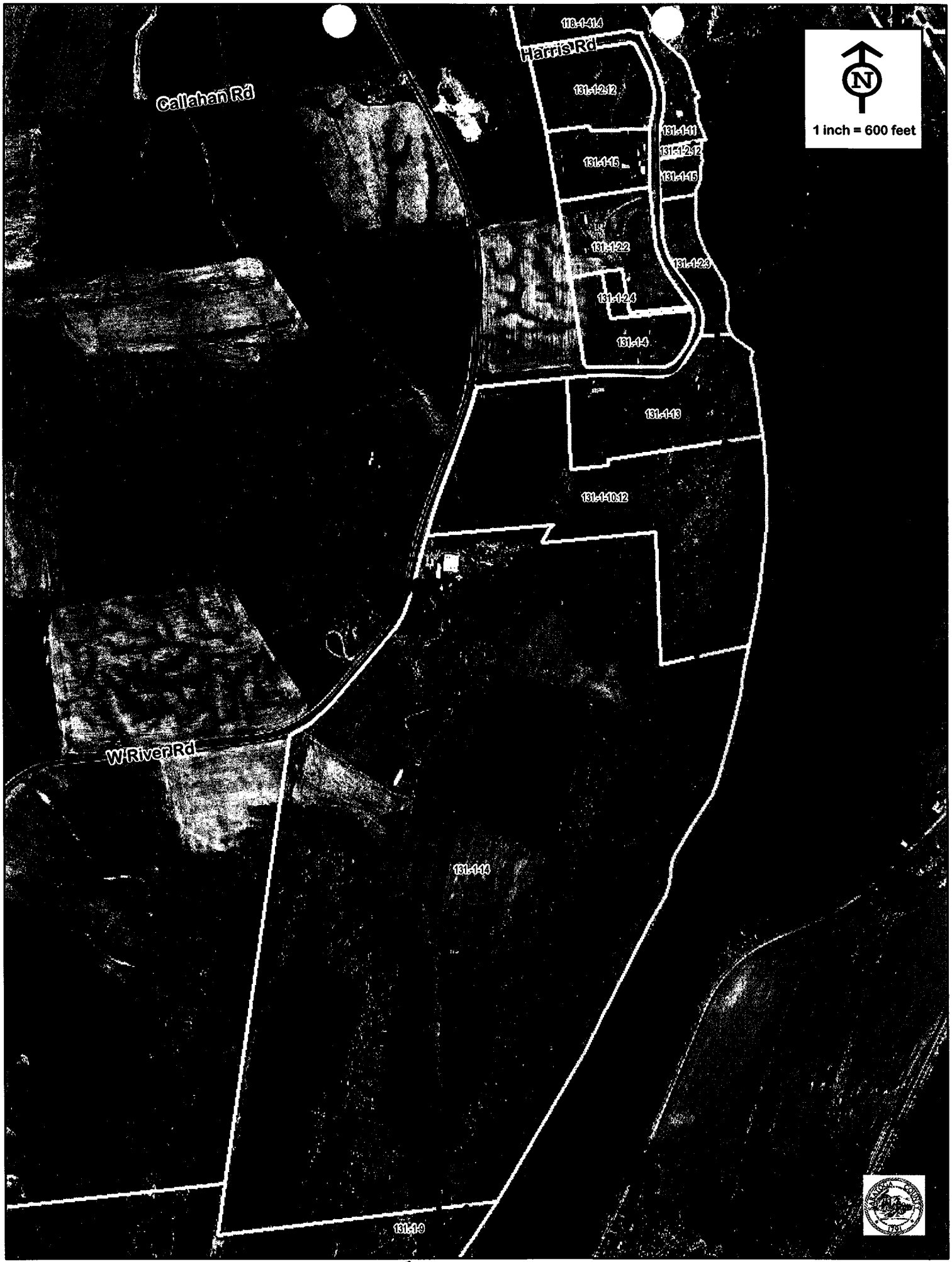
	IMPROVEMENTS NOT IN FLOOD PLAIN	IMPROVEMENTS IN FLOOD PLAIN
HADLEY	37	27
CORINTH	40	40
V/O CORINTH	48	25
MOREAU	28	89
V/O SOUTH GLENS FALLS	4	4
NORTHUMBERLAND	66	19
SARATOGA	16	32
T/O SCHUYLERVILLE	21	37
STILLWATER	32	46
V/O STILLWATER	45	143
MECHANICVLLE	68	21
HALFMOON	30	92
WATERFORD	27	82
V/O WATERFORD	19	234
	481	891

Prepared by the Saratoga County Planning Department 03/12/12

Ex B-1


1 inch = 150 feet
Birch Ln
Pear
Broad St
Beagle Ln
157.64-1-78
157.64-1-43.2
157.64-1-42.1
157.64-1-41
157.64-1-26
157.64-1-40
157.64-1-28
157.64-1-29
157.64-1-39
157.64-1-30
157.64-1-31.2
157.64-1-32
157.64-1-33
157.56-2-20
157.64-1-38
157.64-1-53
157.64-1-74
Elm Ln
Ferry St
Burch Ln
157.64-1-59
157.64-1-55
157.64-1-60
157.64-1-61
157.64-1-84
Church St
Alley
157.56-2-20
157.72-1-29
157.64-1-76
Canal St
157.72-1-4
157.72-1-5
157.72-1-6
Walnut Ln
157.72-1-7
157.72-1-8
157.72-1-28.3
157.72-1-32
157.72-1-17
Burgoyne St
157.72-1-12
157.72-1-13.1
Pine Ln
157.72-1-31
157.80-1-2
157.80-1-1
Grove St
157.72-1-30

Ex B-2


118.-1-41.4
Harris Rd
Callahan Rd
131.-1-2.12
131.-1-11
131.-1-2.12
131.-1-15
131.-1-15
131.-1-2.2
131.-1-2.3
131.-1-2.4
131.-1-4
131.-1-13
131.-1-10.12
W River Rd
131.-1-14
131.-1-9
1 inch = 600 feet

Ex B-4


1 inch = 200 feet
Unnamed Street
Townshed Rd
Kellogg Rd
Cowin St
Campbell Rd
Railroad Ave
Hudson Ave
River Rd
Lansing Rd
Bunce Ln
St Johns Pl
253.34-3-1
253.34-3-2
253.34-3-3
253.34-3-4
253.34-2-9
253.34-2-10
253.34-2-11
253.34-2-12
253.34-2-13
253.34-2-14
253.34-2-15
253.34-2-16
253.34-2-17
253.34-2-18
253.34-2-19
253.34-2-20
253.34-2-21
253.34-2-22
253.34-2-26
253.34-3-20
253.34-3-21
253.34-3-22
253.34-3-23
253.34-3-24
253.33-3-1
253.33-3-2
253.33-3-3
253.33-3-4
253.33-3-5
253.33-3-6
253.33-3-7
253.33-3-8
253.33-3-9
253.41-1-18
253.41-1-19
253.41-1-20
253.41-1-61
253.41-1-23.1
253.41-1-23.2
253.49-1-9

Ex B-5

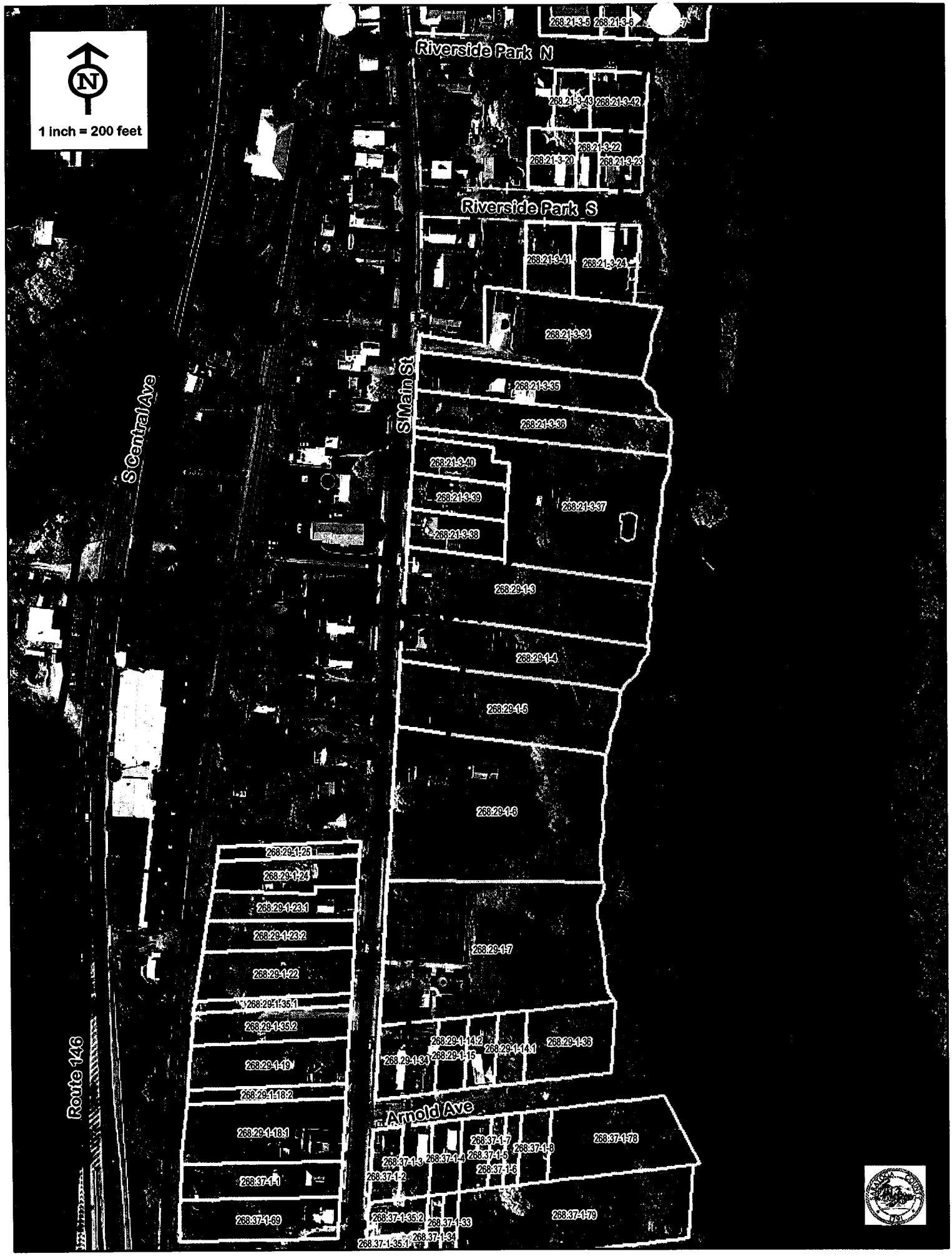

1 inch = 200 feet
Railroad Ave
Towpath Rd
River Rd
Halfway House Rd
253.41-1-23.1
253.41-1-23.2
253.49-1-9
253.49-1-10
253.49-1-11
253.49-1-12
253.49-1-13
253.49-1-14
253.49-1-27
253.57-1-2
253.57-1-9
253.57-1-5.2
253.14-1-2
253.14-1-3
253.14-1-4.2
253.14-1-4.1
253.14-1-5
253.-3-1

Ex B-6

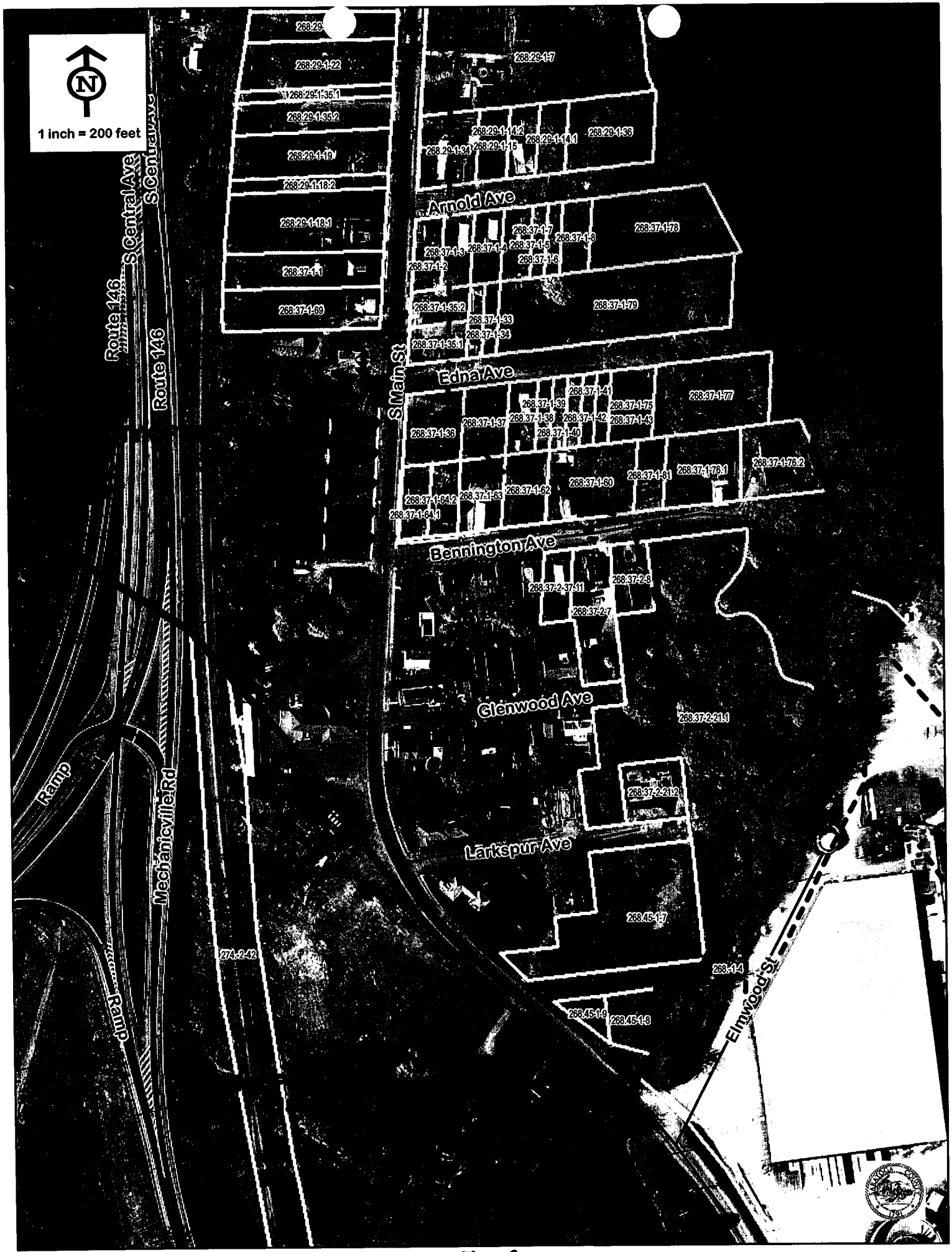

1 inch = 250 feet
River Rd
253.14-1-2
253.14-1-3
253.14-1-4.2
253.14-1-4.1
253.14-1-5
253.14-1-35
253.14-1-8
253.14-1-13
253.14-1-14
253.14-1-15
253.18-2-9
253.18-2-27
253.18-2-11
253.18-2-12
253.18-2-13
253.18-2-14
253.18-2-15
253.18-2-16
253.18-2-17
Mitchell Rd
253.-3-1

Ex B-7


1 inch = 200 feet
Tallmadge P
262.69-3-6
262.69-3-7
262.69-3-9
262.69-3-8
262.69-3-13
Green St
262.69-4-11
262.69-4-12
Underwood Ave
262.69-4-25
262.69-4-27
Newman Ave
262.69-4-37
South St
262.69-4-42
262.69-4-56
Lee St
262.77-2-7
262.77-2-37.1
262.77-2-37.2
262.77-2-8
Ensign Ave
262.77-2-12
262.77-2-18
262.77-2-19
262.77-2-20
262.77-2-21
262.77-2-22
262.77-2-23
262.77-2-24
262.77-2-25
262.77-2-26
262.77-2-27
262.77-2-28
268.21-3-1
268.21-3-5
268.21-3-6
268.21-3-7
Riverside Park N
S Central Ave
Ellsworth Ave
S Main St
Short St
Driveway
Harris Ave


1 inch = 200 feet
Riverside Park N
Riverside Park S
S Central Ave
S Main St
Route 146
Arnold Ave
268.21-3-5
268.21-3-6
268.21-3-43
268.21-3-42
268.21-3-22
268.21-3-20
268.21-3-23
268.21-3-41
268.21-3-24
268.21-3-34
268.21-3-35
268.21-3-36
268.21-3-40
268.21-3-39
268.21-3-37
268.21-3-38
268.29-1-3
268.29-1-4
268.29-1-5
268.29-1-6
268.29-1-25
268.29-1-24
268.29-1-23.1
268.29-1-23.2
268.29-1-22
268.29-1-35.1
268.29-1-35.2
268.29-1-19
268.29-1-18.2
268.29-1-18.1
268.37-1-1
268.37-1-69
268.29-1-7
268.29-1-14.2
268.29-1-14.1
268.29-1-36
268.29-1-34
268.29-1-15
268.37-1-78
268.37-1-7
268.37-1-8
268.37-1-3
268.37-1-4
268.37-1-5
268.37-1-6
268.37-1-2
268.37-1-35.2
268.37-1-33
268.37-1-34
268.37-1-35.1
268.37-1-79

Ex B-9

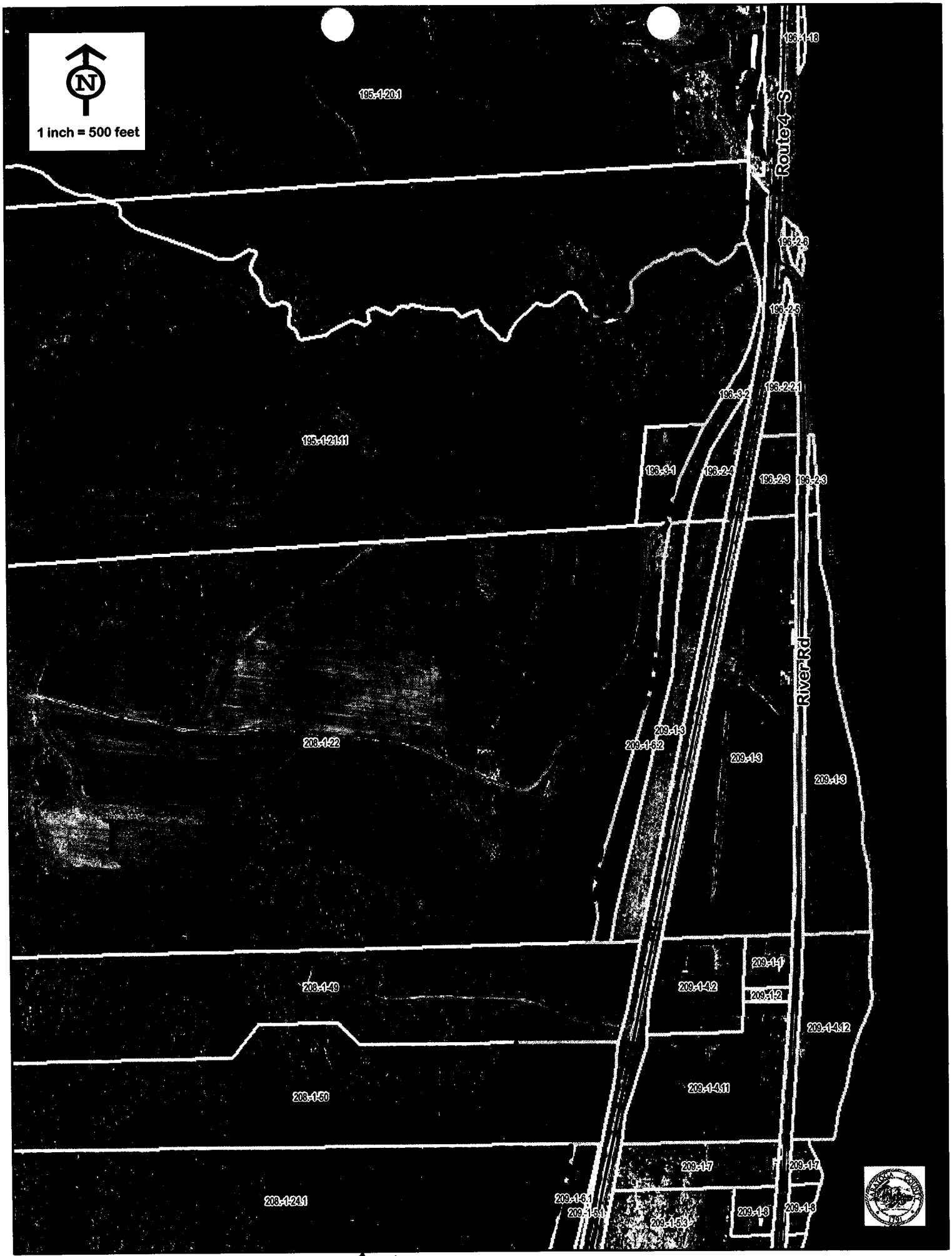

1 inch = 200 feet
268.29
268.29-1-22
268.29-1-35.1
268.29-1-35.2
268.29-1-19
268.29-1-18.2
268.29-1-18.1
268.37-1-1
268.37-1-69
268.29-1-7
268.29-1-14.2
268.29-1-14.1
268.29-1-36
268.29-1-34
268.29-1-15
Arnold Ave
268.37-1-7
268.37-1-8
268.37-1-78
268.37-1-5
268.37-1-4
268.37-1-3
268.37-1-6
268.37-1-2
268.37-1-35.2
268.37-1-79
268.37-1-33
268.37-1-34
268.37-1-35.1
S Main St
Edna Ave
268.37-1-41
268.37-1-77
268.37-1-39
268.37-1-75
268.37-1-38
268.37-1-42
268.37-1-43
268.37-1-37
268.37-1-36
268.37-1-40
268.37-1-76.1
268.37-1-76.2
268.37-1-81
268.37-1-60
268.37-1-62
268.37-1-63
268.37-1-64.2
268.37-1-64.1
Bennington Ave
268.37-2-8
268.37-2-37-11
268.37-2-7
Glenwood Ave
268.37-2-21.1
268.37-2-21.2
Larkspur Ave
268.45-1-7
268.-1-4
268.45-1-9
268.45-1-8
Elmwood St
S Central Ave
Route 146
Route 146
Mechanicville Rd
Ramp
Ramp
274-2-42

Ex B-16

EXHIBIT C

INCLUDES C-1 & C-2

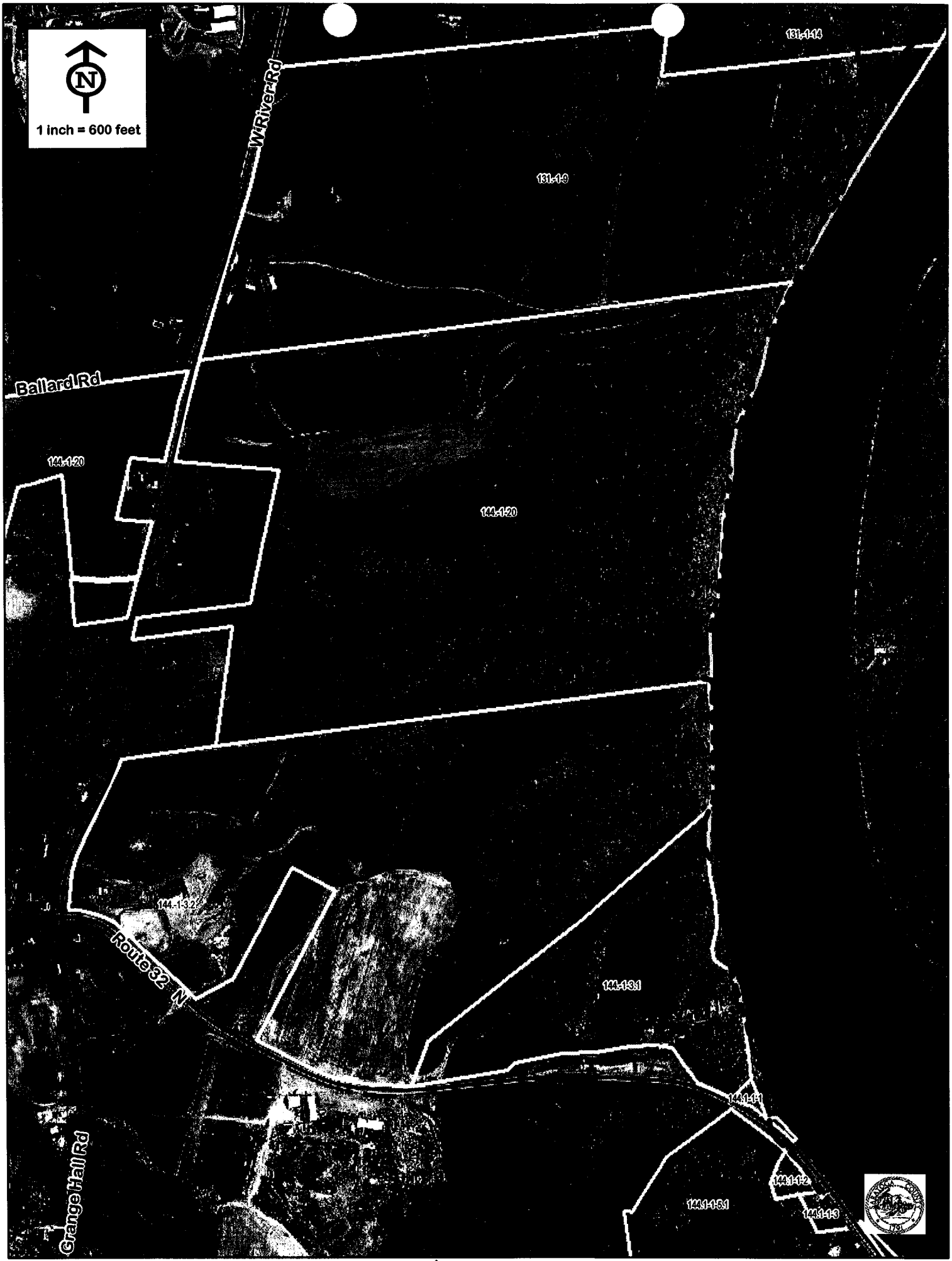
4C-3


1 inch = 500 feet
195.-1-20.1
196.-1-18
Route 4 - S
196.-2-6
196.-2-5
196.-2-2
196.-2-2.1
195.-1-21.11
196.-3-1
196.-2-4
196.-2-3
196.-2-3
River Rd
208.-1-22
209.-1-3
209.-1-3.2
209.-1-3
209.-1-3
209.-1-1
209.-1-4.2
209.-1-2
208.-1-49
209.-1-4.12
208.-1-50
209.-1-4.11
209.-1-7
209.-1-7
208.-1-24.1
209.-1-6.1
209.-1-5.1
209.-1-5.3
209.-1-8
209.-1-8

Ex C-1


1 inch = 1,000 feet
Lohnes Rd
208.-1-17
209.-1-27
209.-1-27
Saratoga National Battlefield Rd
221.-1-1
221.-1-1
Route 4
Phillips Rd
Jughandle
221.-1-22.1
221.-1-22.3
221.-1-22.2
221.-1-21.11
221.-1-4.2
221.-1-4.1
221.-1-4.1
221.-1-20

Ex C-2


1 inch = 600 feet
W. River Rd
Ballard Rd
131.-1-14
131.-1-9
144.-1-20
144.-1-20
144.-1-32
Route 32 N
144.-1-38.1
144.-1-1
144.1-1-2
144.1-1-3
144.1-1-55.1
Grange Hall Rd

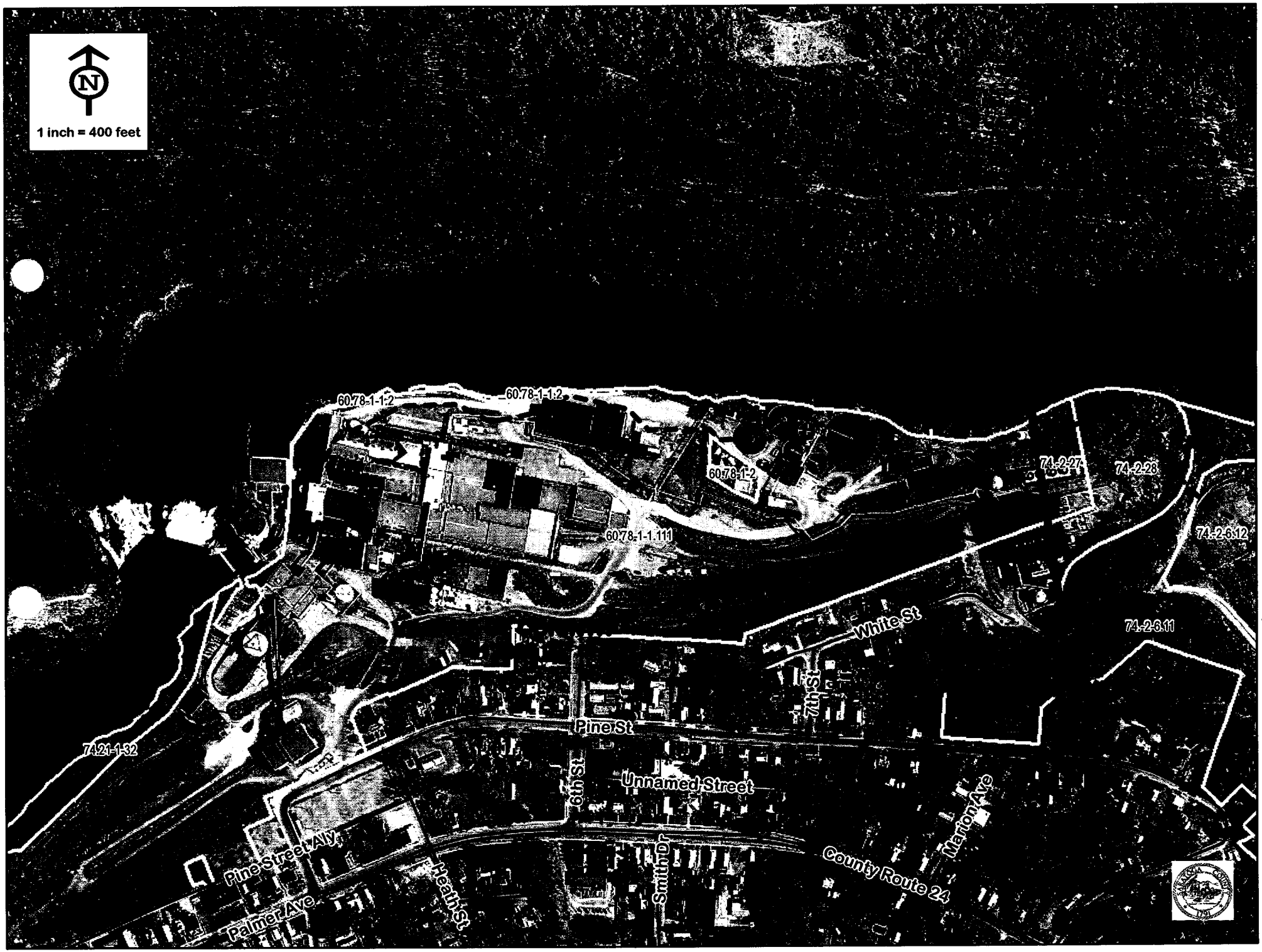
EL C-7.

EXHIBIT D

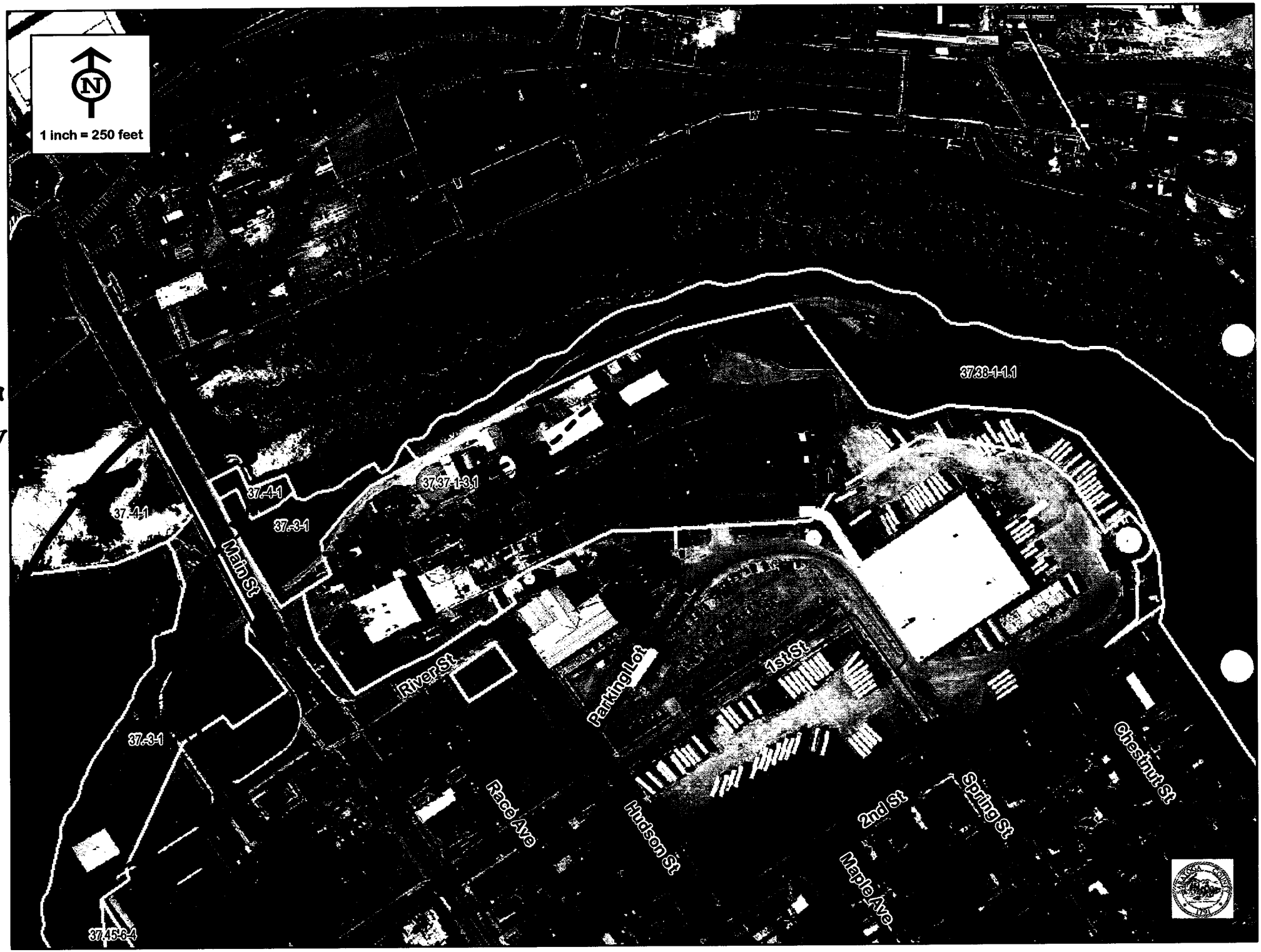
ArcGIS Overlay Mapping of Saratoga County Properties
In 100 year Flood Plain of the Hudson River
If There Were No Great Sacandaga Reservoir

MAJOR INDUSTRIAL/COMMERCIAL FACILITIES WITH
STRUCTURES OUTSIDE FLOOD PLAIN

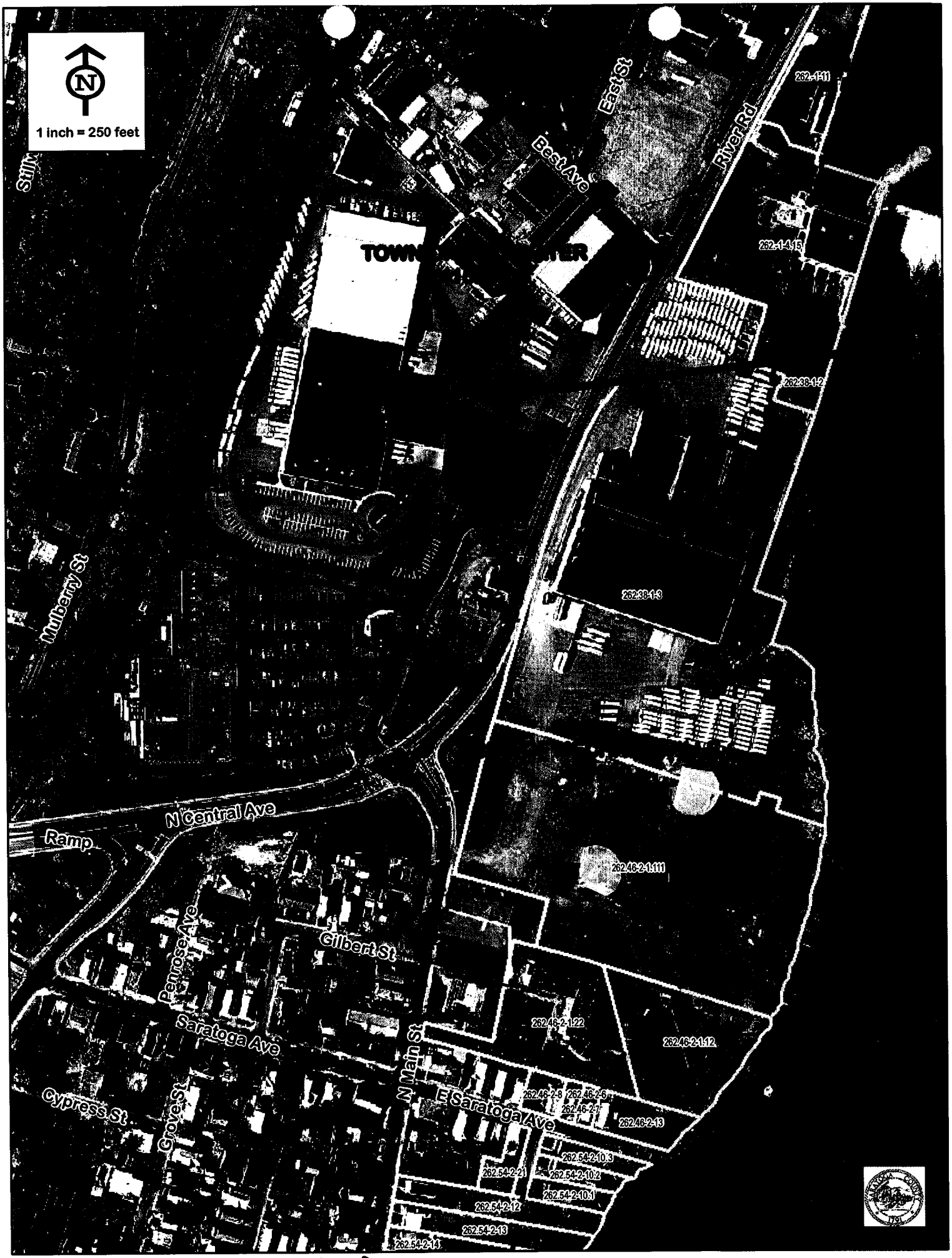
CORINTH	Philmet Capitol Corp. (Ex. D-1)	$ 94,444,800
SOUTH GLENS FALLS	SCA Tissue (Ex. D-2)	$ 9,578,700
MECHANICVILLE	Mechanicville Associates (Ex. D-3)	$ 2,206,446
	Empire Warehousing (Ex. D-3)	$ 3,200,000
	DeJong (Ex. D-4)	$ 1,136,000
HALFMOON	Cascade Tissue (Ex. D-5)	$ 2,000,000
	Perry Textiles	$ 1,900,000
WATERFORD	GE Silicones (Momentum) (Ex. D-6)	$ 43,104,600
	GE Silicones (Momentum)	$ 7,242,350
TOTAL		$164,811,046


1 inch = 400 feet
60.78-1-1.2
60.78-1-1.2
60.78-1-2
74.-2-27
74.-2-28
74.-2-6.12
60.78-1-1.111
74.-2-6.11
White St
7th St
Pine St
74.21-1-32
6th St
Unnamed Street
Marion Ave
Pine Street Aly
Heath St
Smith Dr
County Route 24
Palmer Ave

Ex D-1


1 inch = 250 feet
37.38-1-1.1
37.37-1-3.1
37.-4-1
37.-3-1
37.-4-1
Main St
River St
Parking Lot
1st St
37.-3-1
Race Ave
Hudson St
2nd St
Spring St
Maple Ave
Chestnut St
37.45-6-4

Ex D-2


1 inch = 250 feet
Stillman St
Best Ave
East St
River Rd
262.-1-11
262.-1-4.15
262.38-1-2
262.38-1-3
Mulberry St
N Central Ave
Ramp
262.46-2-1.111
Penrose Ave
Gilbert St
Saratoga Ave
Main St
262.46-2-1.22
262.46-2-1.12
Cypress St
Grove St
E Saratoga Ave
262.46-2-8
262.46-2-6
262.46-2-7
262.46-2-13
262.54-2-10.3
262.54-2-21
262.54-2-10.2
262.54-2-10.1
262.54-2-12
262.54-2-13
262.54-2-14


1 inch = 200 feet
William St
Ferry St
N Main St
Hemstreet Park Brg
State Hwy 67
Adams St
Frances St
Canal St
N Central Ave
Hudson St
River St
Hill St
Terminal St
Park Ave
S Central Ave
S Main St
Post Office Aly
Unnamed Street
Tallmadge Pl
262.54-2-16
262.54-2-17
262.54-2-18
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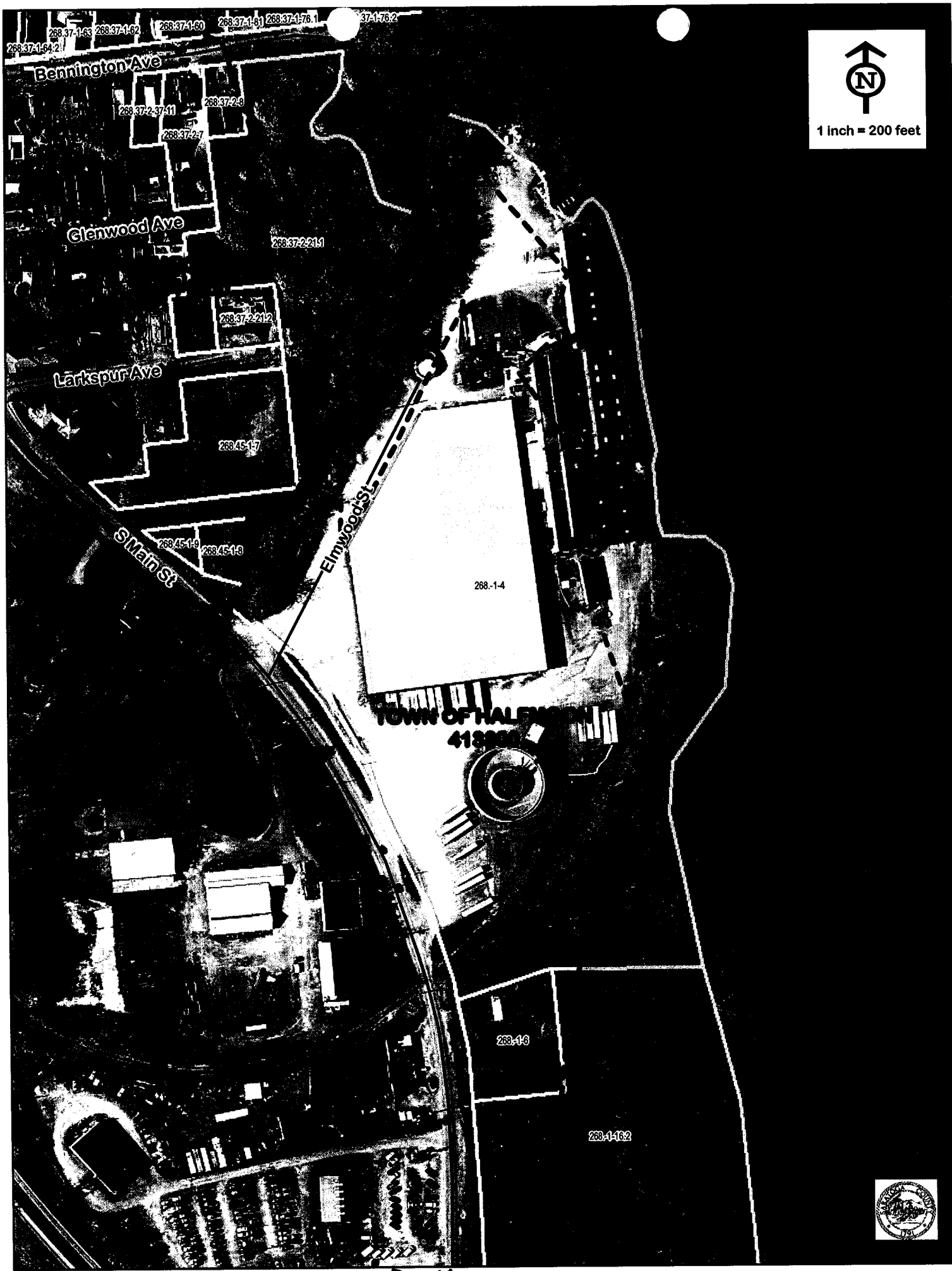
Ex D-4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Glenwood Ave
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Larkspur Ave
268.45-1-7
S Main St
268.45-1-9
268.45-1-8
Elmwood St
268.-1-4
268.-1-6
268.-1-16.2
1 inch = 200 feet


1 inch = 700 feet
274.-2-42
286.-1-38
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286.-1-37
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286.-1-42
286.-1-6
286.-1-7
286.-1-56
286.-1-56
286.-1-8
286.-1-9
286.-1-48
Schoolhouse Ln
286.-1-10
286.-1-48
286.-1-11
286.-1-12
286.-1-13.1
286.-1-13.2
286.-1-14
Bells Ln N
Parking Lot
286.-1-56
286.-1-56
286.-1-56
286.-1-42
Clute Rd
Clute St
286.-1-15.1
286.-1-56
286.-1-54
Bells Ln
Cherry St
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286.-1-42
286.-1-20
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291.7-1-45
291.7-1-44
Hudson River Rd
291.7-1-1
291.7-1-6
291.7-1-43
291.7-1-9
291.7-1-42
291.7-1-10
291.7-1-41
291.-2-71
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286.-1-42
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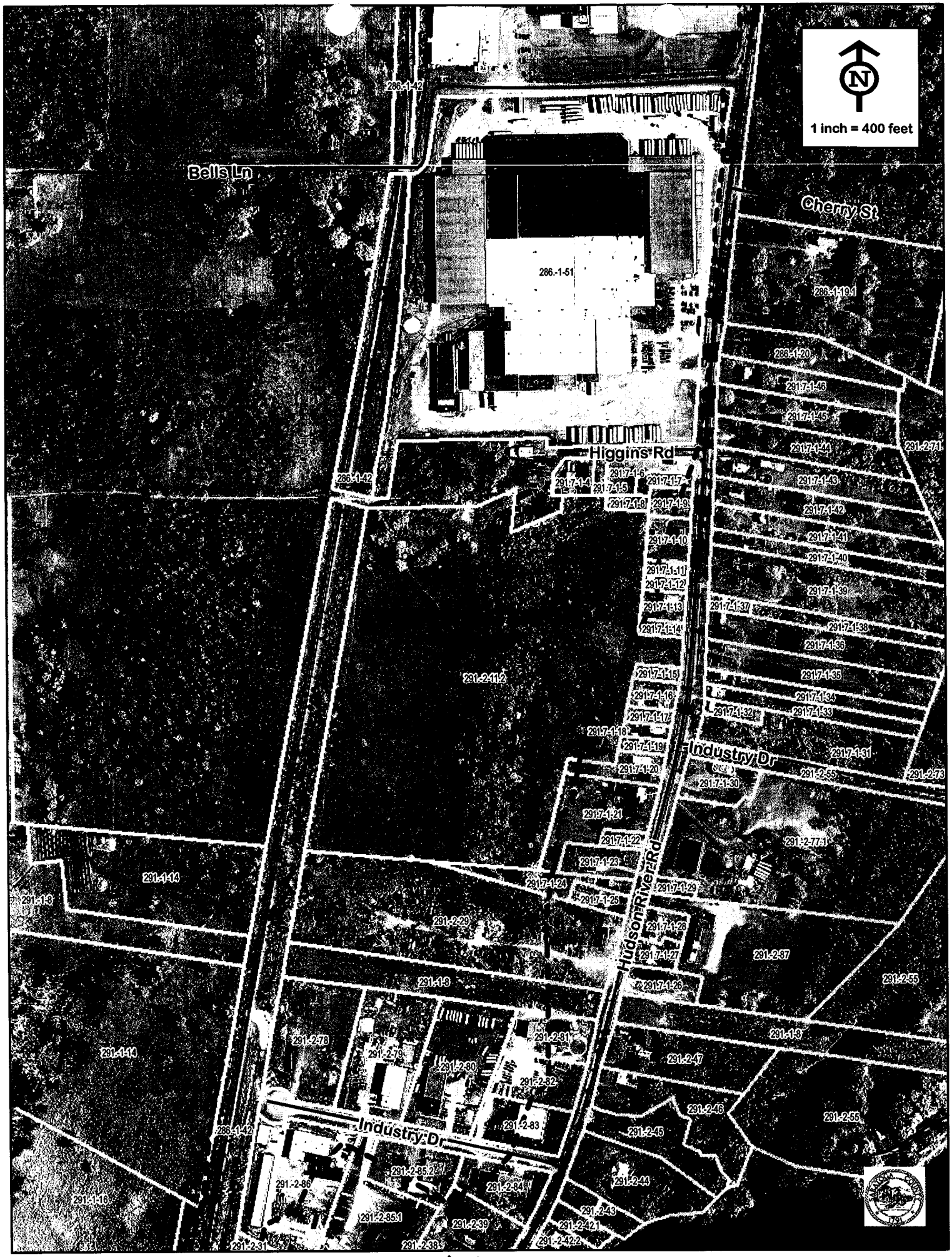
291.7-1-40



Prepared by the Saratoga County Planning Department 03/12/19

Ex. D-7


1 inch = 500 feet
Columbus Ave
Davis Ave
Van Ness St
Fairview Ave
Maple Ave
King St
Broad St
6th St
5th St
Short 6th St
6th St
Burton Ave
South St
Mohawk Ave
Middle St
2nd St
Alley
Steenburgh Ave
4th St
Arch St
Saratoga Ave
Champlain St
Mohawk Ave
Mill Rd
Canal St
Fulton St
Peebles Island Rd
Front St
1st St
Park St
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EXHIBIT E

ArcGIS Overlay Mapping of Saratoga County Properties
In 100 year Flood Plain of the Hudson River
If There Were No Great Sacandaga Reservoir

HYDROELECTRIC POWER GENERATION FACILITIES

HADLEY	75,532,300
CORINTH	118,095,800
MOREAU	209,064,749
NORTHUMBERLAND	9,289,000
STILLWATER	33,100,000
HALFMOON	3,000,000
WATERFORD	1,322,000
	449,403,800

EXHIBIT F

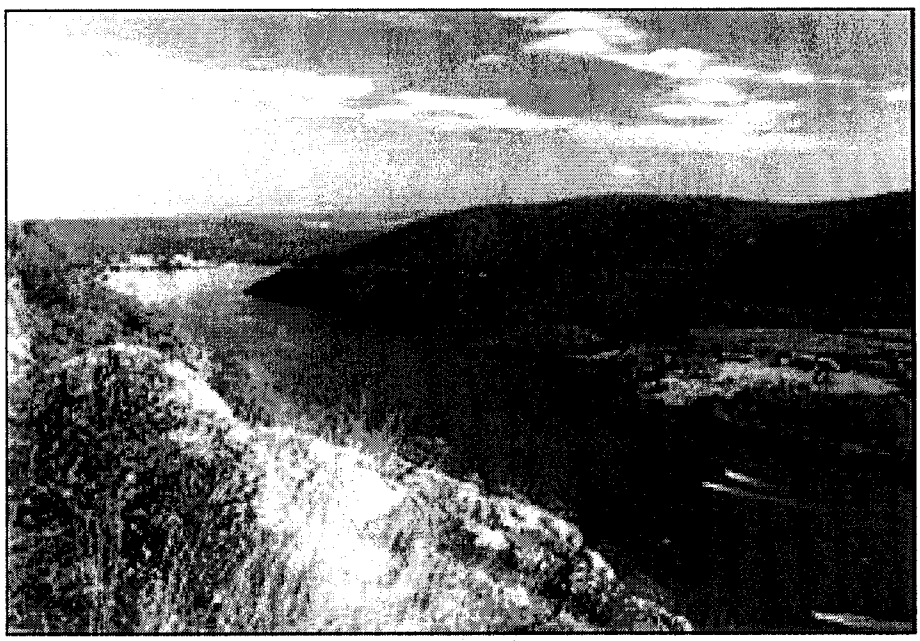
ArcGIS Overlay Mapping of Saratoga County Properties
In 100 year Flood Plain of the Hudson River
If There Were No Great Sacandaga Reservoir

STATE OF NEW YORK PARCELS IN FLOOD PLAIN

CORINTH	0
HADLEY	0
HALFMOON	1,852,025
MECHANICVILLE	90,600
MOREAU	181,476
NORTHUMBERLAND	500,000
SARATOGA	1,055,600
STILLWATER	368,200
WATERFORD	1,414,900
TOTAL	11,365,601

FINAL REPORT

HUDSON RIVER FLOW REGULATION BENEFIT STUDY



Prepared for:

HUDSON RIVER-BLACK RIVER
REGULATING DISTRICT

Prepared by:

Gomez and Sullivan Engineers, P.C.

July 2003

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1.0 Introduction

The Hudson River-Black River Regulating District (District) is a public benefit corporation organized and operating in accordance with Title 21 of Article 15 of the New York State Conservation Law. It was formed in 1959 when the former Hudson River and Black River Regulating Districts were merged. The District operates two reservoirs, Great Sacandaga Lake and Indian Lake, in the Hudson River Basin. Great Sacandaga Lake was created in 1930 by the construction of the Conklingville Dam on the Sacandaga River, about six miles above its confluence with the Hudson River. At the time of its construction, its intended purpose was to reduce floods and increase the low water flow of the Sacandaga and Hudson Rivers for hydroelectric power generation. Since its construction, other benefits have been realized.

As part of the Upper Hudson/Sacandaga River Offer of Settlement Agreement, the District agreed to conduct a headwater benefit analysis to identify potential beneficiaries and the relative magnitude of the benefits they receive from flow regulation provided by Great Sacandaga Lake. This study was completed as part of the District commitments under the settlement agreement.

1.1 Project Operations

Great Sacandaga Lake is a 25,940 acre impoundment. The emergency spillway crest elevation is 771 MSL. The District's current operating policy is based on the Upper Hudson/Sacandaga River Offer of Settlement Agreement. That policy balances the needs of flood control, low flow augmentation for waste assimilation and fish habitat, hydroelectric power generation, lake recreation, whitewater recreation and navigation.

Historically (prior to the Upper Hudson/Sacandaga Offer of Settlement Agreement, March 27, 2000-see Appendix A), Great Sacandaga Lake was regulated to provide a flow of 3000 cfs in the Hudson River downstream of the confluence of the Sacandaga River, from Monday to Saturday from May 1 through Labor Day. On Sundays and holidays, the flow was less than 1000 cfs. This was accomplished by filling Great Sacandaga Lake to elevation 768 in late spring by not allowing any flow releases for approximately three weeks. The purpose of this was to avoid or reduce spring flooding and to collect water in storage to augment summer flows. As the summer progressed, the water level of Great Sacandaga Lake was then drawn down to provide releases for downstream users while maintaining a lake level above 756 during the period May 1 through Labor Day. During fall and winter, the District continued to draw down the lake to provide storage for rainy periods in November-December and for spring runoff. By the middle of March, the average reservoir level was elevation 744.

Following the Upper Hudson/Sacandaga Offer of Settlement Agreement, regulation of Great Sacandaga Lake was changed to provide higher lake elevations between Labor Day and Columbus Day for fall lake recreation and to provide base flows in the Sacandaga River year-round by increasing the winter drawdown elevation. The new regulation is to be phased in over 20 years.

The first operation scenario was scheduled from license issuance to June 1, 2010 and is targeted to achieve a maximum winter drawdown elevation of 748 by mid-March in anticipation of snowmelt and spring flows. The District will maintain this low level until mid-April when it will begin to refill the reservoir to an elevation of 768 in the first week of June. Once the reservoir is filled, the District will maintain an average flow in the Hudson River below the confluence with the Sacandaga River of 1760 cfs. At the same time, the District will also maintain a lake level above 760 from May 1 to Columbus Day. The reservoir will continue to be drawn down through fall and winter from elevation 760 to a maximum drawdown in mid-March at elevation 748.

The second operation scenario scheduled from June 2, 2010 to June 1, 2020 is targeted to achieve a maximum winter drawdown elevation of 749. The District will maintain this low level until mid-April when it will begin to refill the reservoir to an elevation of 768 in the first week of June. Once the reservoir is filled, starting in 2013, the District will maintain a base flow in the Sacandaga River between 300 and 350 cfs depending on the reservoir elevation and an average flow in the Hudson River below the confluence with the Sacandaga River of 1760 cfs. At the same time, the District will also maintain a lake level above 760 from May 1 to Columbus Day. The reservoir will continue to be drawn down through fall and winter from elevation 760 to a maximum drawdown in mid-March at elevation 749.

The final operation scenario scheduled from June 2, 2020 to FERC license expiration is targeted to achieve a maximum winter drawdown elevation of 750. The District will maintain this low level until mid-April when it will begin to refill the reservoir to an elevation of 768 in the first week of June. Once the reservoir is filled, the District will maintain a base flow in the Sacandaga River between 300 and 350 cfs depending on the reservoir elevation and an average flow in the Hudson River below the confluence with the Sacandaga River of 1760 cfs. At the same time, the District will also maintain a lake level above 760 from May 1 to Columbus Day. The reservoir will continue to be drawn down through fall and winter from elevation 760 to a maximum drawdown in mid-March at elevation 750.

1.2 Statutory Authority to Assess Beneficiaries

Title 21 of Article 15 of the New York State Environmental Conservation Law requires that the cost of operation of the District's reservoirs be apportioned upon any public corporation or parcel of real estate benefited. The cost to individual beneficiaries is to be proportioned based on the benefits received. Therefore, any corporation, individual property owners, municipalities, counties, and the State of New York can be assessed for benefits derived from operation of the Great Sacandaga Lake. Presently, benefits are assessed for industry (hydropower) and flood protection. An annual apportionment schedule allocating the District's expenses is determined every 3 years. Benefits as defined in Article 15-2101.3 include "benefits to real estate, public or private, to municipal water supply, to navigation, to agriculture and to industrial and general welfare. The list of potential benefits is described in Section 2 of this report.

2.0 Hudson River Flow Regulation Benefits

The benefits created by construction of the Conklingville Dam and Great Sacandaga Lake are numerous. A list of these benefits includes:

- Increased Real Estate Values for Lakeshore Property
- Lake Recreation
- Hydroelectric Power Generation
- Flood Protection
- Waste Assimilation
- Whitewater Recreation
- Water Supply
- Downstream Water Recreation
- Downstream Fisheries Enhancement
- Navigation

As discussed below, the economic benefits to water supply, downstream water recreation, downstream fisheries enhancement and navigation are very small when compared to the other categories.

3.0 Methodology to Evaluate Benefits

In order to develop an assessment schedule, all the significant economic benefits should be quantified and summed. The percentage of the total benefits allocated to each benefit category can then be calculated. The benefit derived by individual beneficiaries can then be calculated by the portion of the total benefit category they receive. With these numbers in hand, the cost of operation of Great Sacandaga Lake can then be calculated for each benefit category and for each beneficiary. The addition of the benefit values requires that each benefit be quantified in the same units, dollars. Therefore, all benefits have been calculated on an annual basis as June 2001 dollars. Unfortunately, at this time we are not able to quantify one major benefit on an annual basis - increased real estate values for lakeshore property. The reasons are discussed below.

Based on initial investigations, it was evident that the benefit study should focus on those uses that derive the most benefit from Hudson River flow regulation and which have not been previously quantified. Lake recreation, navigation, and water supply benefits that have already been quantified previously into dollars have been indexed using the Consumer Price Index to June 2001. Downstream water recreation and downstream fisheries benefits have not been studied in detail because their economic value is much smaller compared to the major benefits.

3.1 Increased Real Estate Values for Lakeshore Property

One of the biggest benefits of Great Sacandaga Lake is the creation of 125 miles of lakeshore property. The increased real estate benefits derived from the Great Sacandaga Lake would be the difference between current property values and property values without the reservoir. A literature search yielded very little information to quantify this benefit.

The Great Sacandaga Lake region is defined as those townships, which share a piece of the approximately 125 miles of lake shoreline. The townships include Northampton, Mayfield, and Broadalbin, which are located in Fulton County; and the townships of Edinburg, Day, and Providence, which are located in Saratoga County. According to the deSeve report (1984), the 1984 market value of seasonal lake property (from a survey of 2,000 seasonal residences) was $117 million. This survey also reported that there were a total of 9,841 total housing units in the Great Sacandaga Lake Region but did not give their dollar value. The market value of the total housing units (9,841) is expected to be greater than $117 million since there are almost 5 times as many properties compared to the sample size (2000) and they are expected to have more amenities since many are inhabited year-round.

A previous real estate appraisal for the District's reservoir lands in the Town of Northhampton can provide some information on current lakefront property values if Great Sacandaga Lake did not exist. The appraisal by the NYS Division of Equalization and Assessment, conducted in 1992, was performed to determine the without project value of District reservoir lands[1] in the Town of Northampton. The NYS report reviewed historical records, aerial maps, topography and geology maps to determine the land use of each of the 380 parcels prior to reservoir construction. Then a map of probable Adirondack Park Agency (APA) zoning for the inundated reservoir area was developed based on APA zoning for the Sacandaga River north of the reservoir and the Hudson River between North Creek and Lake Luzerne. The probable APA zoning for each parcel was determined based on likely physical attributes, location, access, and likely public amenities. Market values for each type of APA zoning/land use were determined using a Sales Comparison Approach. Property values ($/ac) for each zoning/land use were determined from comparable locations in 4 other counties in the

[1] The District owns all land below water elevation 778 (7 feet above spillway crest)

Assessed value of ADJACENT LANDS SHOULD
W/OUT GSL VALUE S. IF THEY ARE PROPORTL. TO SALES
BASED ON 1922 VALUE

Adirondack Park for riverfront and non-riverfront property. The land values from the NYS appraisal could be applied to properties adjoining Great Sacandaga Lake to determine their real estate value if Great Sacandaga Lake did not exist (i.e. Conklingville Dam had not been constructed).

The current real estate value for properties around the perimeter of Great Sacandaga Lake could be determined from property tax information. The increased real estate benefit of flow regulation would be the difference between the real estate value of properties with and without the presence of Great Sacandaga Lake. However, this analysis, while potentially representing a significant benefit attributable to the existence of Great Sacandaga Lake, was beyond the scope of this report.

3.2 Lake Recreation

Lake recreation includes boating, swimming, fishing, and sunbathing. According to the Upper Hudson/Sacandaga River Offer of Settlement Agreement, Great Sacandaga Lake will be managed for lake recreation from Memorial Day weekend to Columbus Day weekend. The value determined by deSeve (1984) for lake recreation, $16.8 million/year was indexed to June 2001. This cost was composed of day use ($2.3 million), seasonal residents ($11.1 million), boaters ($0.9 million), property taxes by seasonal residents ($1.9 million), and property maintenance costs of seasonal residents ($0.6 million). This computation was based on user-days of seasonal and non-residents, and did not include permanent residents. In addition, the lake recreation benefit did not include a value associated with shoreline real estate.

3.3 Hydroelectric Power Generation

In order to quantify flow related benefits, a HEC5P operations model of the Great Sacandaga Lake/Upper Hudson River system was used. This model was initially developed by Erie Boulevard Hydropower as part of the FERC relicensing negotiations associated with several of the Upper Hudson River projects. During negotiations, the HEC5P model was used for evaluating impacts associated with flow regulation in terms of hydroelectric power generation, and flood/low flow magnitude and frequency.

The HEC5P model originally developed by Erie Boulevard Hydropower terminated at the Hudson Falls hydroelectric project. For this study, the model was extended downstream to encompass all hydroelectric projects and river basin hydrology down to the Green Island Hydroelectric Project (Troy Lock and Dam). Table 1 lists all of the hydroelectric projects on the mainstem of the upper Hudson River by FERC license number, licensee, project name, station capacity and river mile and Figure 1 shows the location of each hydroelectric project. FERC licenses to construct the Northumberland and Waterford Projects at existing dams were issued; however, construction has not commenced.

Once the extension of the HEC5P model was completed, it was executed for two scenarios. The first scenario reflected the operational conditions set forth in the settlement agreement for the Upper Hudson/Sacandaga River Offer of Settlement Agreement[2]. The second scenario reflected run-of-river operation at Great Sacandaga Lake.

For hydroelectric power generation computations at a particular project, HEC5P uses the basic power equation:

[2] The settlement agreement stipulates that the targeted elevations for winter maximum drawdown will be 748 feet from license issuance to 6/1/2010, 749 feet from 6/2/2010 through 6/1/2020, and 750 feet from 6/2/2020 through license expiration.

$$P=\frac{QH_{net}\bullet \eta_{sys}}{11.8}$$

Where: P= Power (kW)
Q= Turbine Discharge (cfs)
H_{net}= Net Head (ft), which is equals the headwater minus tailwater minus headlosses
$\bullet \eta_{sys}$= Station Efficiency (%)
11.8= Constant for English/Metric conversion

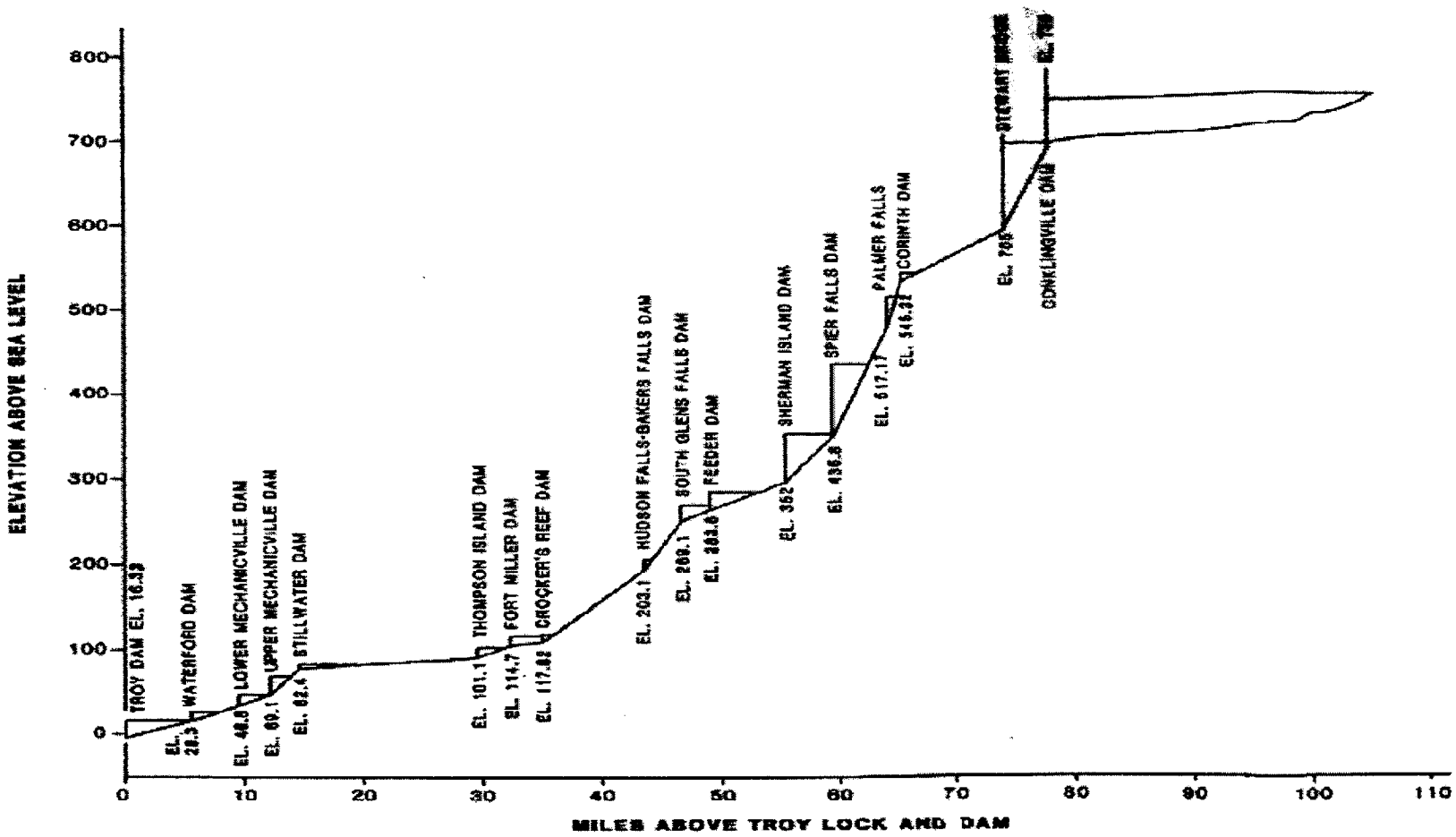
The monthly average energy generated at each hydroelectric project was calculated for peak and non-peak periods based on the hydrologic period of record from 1922 to 1995 for each operational scenario (see Appendix B). This information allowed for a computation in MWH of the net monthly benefit each hydroelectric project receives from flow regulation.

Table 1: Hydroelectric Stations in the Upper Hudson River Watershed

FERC No.	Project Licensee	Project Name	Capacity (MW)	River Mile
2318	Erie Boulevard Hydropower	E.J. West	20	(Sacandaga River) 6
2047	Erie Boulevard Hydropower	Stewarts Bridge	30	3
2609	Curtis/Palmer Hydroelectric	Curtis Station	10.8	(Hudson River) 218
2609	Curtis/Palmer Hydroelectric	Palmer Falls	48	218
2482	Erie Boulevard Hydropower	Spier Falls	51	213
2482	Erie Boulevard Hydropower	Sherman Island	30	209
2554	Erie Boulevard Hydropower	Feeder Dam	6	202
2385	Finch Pruyn	Glen Falls	12	200
5461	Adirondack Hydro	South Glen Falls	15.7	200
5276	Adirondack Hydro	Hudson Falls	36.1	198
4226	Mercer Companies, Inc.	Fort Miller	4.8	187
4244	Northumberland Hydro Partners	Northumberland	NA	184
4684	Stillwater Hydro Partners	Stillwater Hydro	3.5	168
2934	NYSEG	Mechanicville Upper	18.5	166
6032	Fourth Branch Associates	Mechanicville Lower	4.5	164
10648	Adirondack Hydro	Waterford	NA	160
13	Green Island Power Authority	Green Island	6	154

The monthly benefits for each project were summed for conditions with and without flow regulation. The difference in monthly energy generation was converted to dollars by multiplying the energy generated by the price of peak and nonpeak energy. There is some difficulty in predicting these prices as the energy generation and distribution system is in the early years of conversion from a regulated to a deregulated market. For this reason, hydroelectric energy values were converted to dollars by multiplying the monthly energy generation values by the cost paid by the Independent System Operators for the 12 month period June 2000-May 2001 as reported by the New York State Public Service Commission for the Capitol region of the state (see Appendix C).

Figure 1: Profile of Upper Hudson and Sacandaga Rivers Troy Lock and Dam to Great Sacandaga Reservoir (Source: Stetson-Dale, 1986).



3.4 Flood Protection

The cities of Troy, Albany, Rensselaer Watervliet, and Green Island currently are assessed headwater benefit charges from the District. To determine the annual flood benefits associated with Great Sacandaga Lake it was necessary to combine a flood frequency analysis with a stage versus discharge analysis and a stage versus damage (dollars) analysis to compute a damage frequency curve at various locations. Integrating under the resulting damage frequency curve gave an estimate of the average annual damages (see Figure 2). As described below, the flood frequency and stage versus discharge relationships were calculated at various locations. The District contracted with the NYSDEC to conduct a stage damage assessment for the 2, 10, 50 and 100 year flood events with and without regulation by Great Sacandaga Lake.

To determine the net flood frequency at various locations on the Upper Hudson River, peak annual average daily flow values (for each downstream dam) were output from the HEC5P model under the 750-foot winter maximum drawdown settlement scenario (settlement scenario with least amount of storage) and run-of-river operation. Using the peak annual flows, a Log-Pearson Type III flood frequency analysis was completed to determine the 2, 10, 50, and 100 year flood events at each downstream dam.

Elevations for each flood recurrence interval were then determined using individual rating curves associated with each dam. The resulting elevations reflected the predicted maximum water stage of each impoundment under the two operating scenarios. The difference in flood elevation between the two operating scenarios was computed. Table 2 reports the flow and elevation for flow regulation and run-of-river conditions for different flood events and the difference in flood stages resulting from the two conditions.

Downstream of the Troy Dam to the tidal gage in Albany, water surface elevations during floods are not a function of discharge alone, but a complex function of discharge, flood volume, tide levels and wind effects. Rather than attempt to treat these factors separately, an analysis to establish a peak elevation-frequency relationship was used to treat their combined effect. Annual peak stage data from 1910-1977 at the tidal gage (no. 01359139) in Albany, provided by the Troy, New York office of the USCOE, was obtained. A frequency analysis of annual peak stages was conducted for flow regulation and run-of-river conditions. The period of record 1910-1929 represented run-of-river conditions and the period of record 1930 to 1977 represented flow regulation conditions.

This information as well as data from FEMA Flood Insurance Studies was used to calculate elevations downstream to the southern corporate limits-Towns of Schodack/Coeymans, the most downstream location where flood stages were predicted. The elevation for the 2 year flood event with flow regulation at the southern corporate limits–Town of Schodack/Coeymans was determined using a linear regression analysis of the 10, 50 and 100 year flood stages, which were reported in the FEMA Flood Insurance Studies. The elevations for the run-of-river operation at the southern corporate limits–Town of Schodack/Coeymans were estimated from the relationship of run-of-river and flow regulation flood stages at the Albany tidal gage and the flood stages for flow regulation at the southern corporate limit-Towns of Schodack/Coeymans. The accuracy of predicted flood stages for the 13 mile river segment between the Albany gage and the southern corporate limits-Towns of Schodack/Coeymans is not as accurate as the other 82 miles studied. The tidal flood stages for different storm events are shown in Table 2.

The District contracted with the NYSDEC to complete a preliminary estimate of the benefit of flow regulation for the 100 year flood event (Appendix D). The preliminary analysis extended downstream just south of the Dunn Memorial Bridge in the cities of Albany and Rensselaer, NY. Subsequently,

additional work was completed to extend the analysis to the southern corporate limits-Towns of Schodack/Coeymans and for other storm events using the same methodology. The computed damages resulting from the 100 year storm for run-of-river and flow regulation scenarios in the 2002 NYSDEC report (Appendix D) differ from those reported recently for two reasons. First, an additional 13 miles of stream was added to the analysis. Second, a review of the previous analysis indicated that several commercial properties were erroneously excluded. For a discussion of the NYSDEC GIS methodology to compute flood damages based of the predicted flood elevations and real property values, please refer to Appendix D.

Flood damages within the study area were then calculated for the 2, 10, 50, and 100 year flood events for both regulated and unregulated conditions. The average annual flood damage for each case is equal to the area under the damage probability curve. The annual flood protection benefit (i.e. damage reduction) is the difference in the annual flood damages determined with and without flow regulation.

The flood analysis encompassed the following communities: City of Albany, City of Cohoes, City of Mechanicville, City of Rensselaer, City of Troy, City of Watervliet, Town of Bethlehem, Town of Coeymans, Town of Colonie, Town of Corinth, Town of East Greenbush, Town of Easton, Town of Fort Edward, Town of Greenwich, Town of Hadley, Town of Halfmoon, Town of Moreau, Town of New Baltimore, Town of North Greenbush, Town of Northumberland, Town of Queensbury, Town of Saratoga, Town of Schaghticoke, Town of Schodack, Town of Stillwater, Town of Stuyvesant, Town of Waterford, Village o Castleton-on-Hudson, Village of Corinth, Village of Fort Edward, Village of Green Island, Village of Hudson Falls, Village of Menands, Village of Schuylerville, Village of South Glens Falls, Village of Stillwater, and the Village of Waterford.

Information used in the analysis included elevations and flows from the HEC5P model and from a stage frequency analysis of the tidal gage at Albany; and existing topographic, aerial and tax property mapping. Structural and contents damages resulting from each flood event were based on depth damage curves developed by the USCOE for residential and commercial properties.

Table 2: Hudson River Flows and Elevations for 2, 10, 50, and 100 Year Flood Events for Flow Regulation and Run-of-River Operation

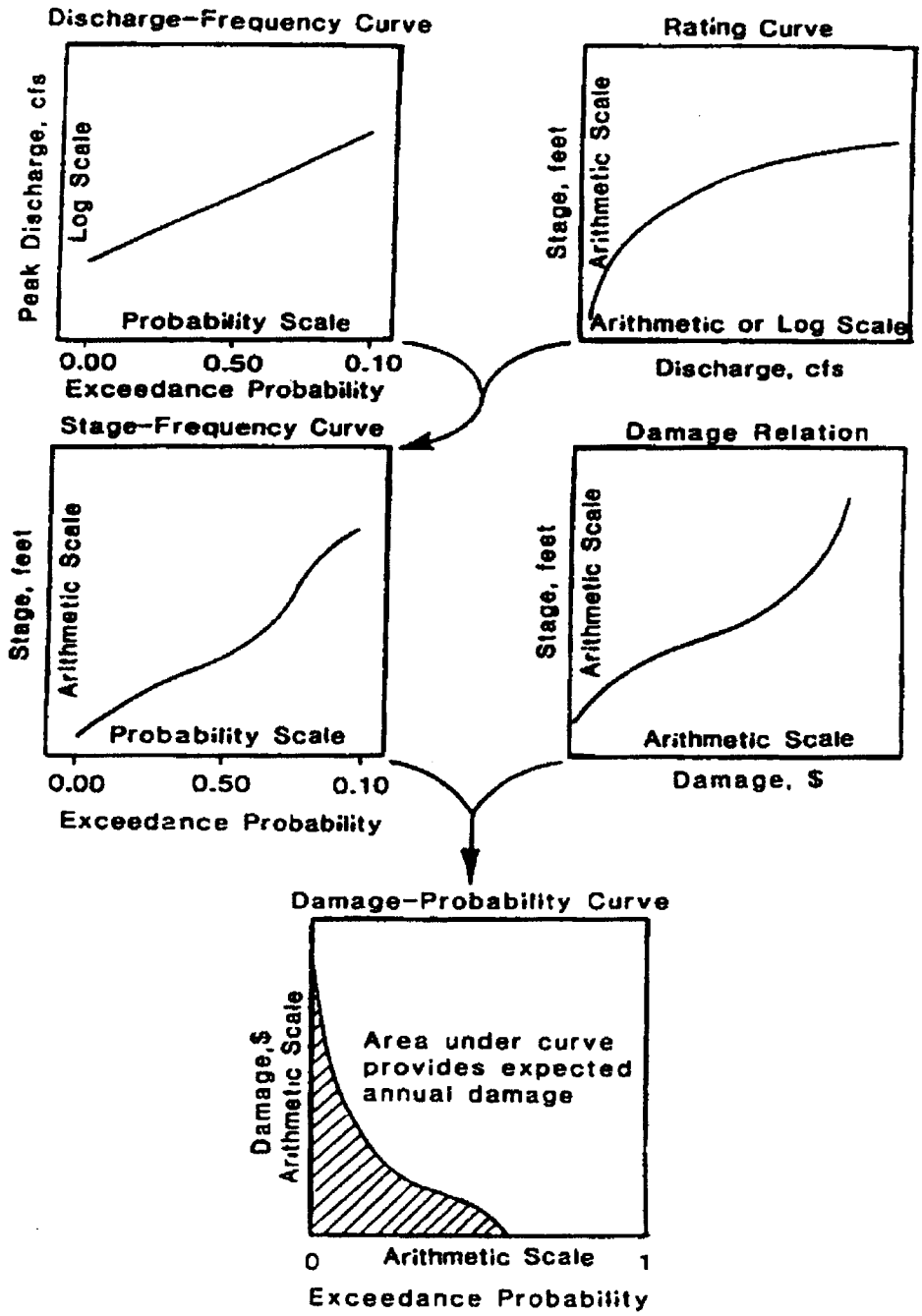
Location	Drainage Area (sq. mi.)	Recurrence Interval	Flow Regulation[3]		Run-of-River		
			Flow (cfs)	Elevation (ft)	Flow (cfs)	Elevation (ft)	Difference (ft)
Curtis (Corinth)	2760	100	45,568	553.4	76,749	555.4	2.0
		50	41,921	553.1	71,552	555.1	2.0
		10	32,632	552.4	57,466	554.2	1.8
		2	21,625	551.4	39,784	553.0	1.5
Palmer Falls)	2760	100	45,568	531.9	76,749	536.4	4.4
(Corinth		50	41,902	531.3	71,517	535.7	4.3
		10	32,625	529.7	57,438	533.7	4.0
		2	21,626	527.6	39,770	531.0	3.4
Spiers Falls	2779	100	45,585	443.4	76,749	446.8	3.4
		50	41,940	442.9	71,554	446.2	3.3
		10	32,654	441.7	57,467	444.8	3.1
		2	21,644	440.0	39,790	442.7	2.7
Sherman	2810	100	46,019	359.4	77,352	362.3	2.9
		50	42,379	359.0	72,002	361.8	2.9
		10	33,064	357.9	57,498	360.5	2.6
		2	21,959	356.5	39,745	358.7	2.2
Feeder Dam	2811	100	45,983	291.6	77,312	295.1	3.5
		50	42,351	291.1	71,973	294.5	3.4
		10	33,054	289.9	57,495	293.0	3.1
		2	21,944	288.2	39,741	290.8	2.6
South Glens Falls	2807[4]	100	45,967	274.4	77,296	277.0	2.6
/Finch Pruyn		50	42,334	274.0	71,956	276.6	2.6
		10	33,038	273.1	57,478	275.4	2.3
		2	21,927	271.8	39,724	273.8	2.0
Hudson Falls	2821	100	46,180	213.3	77,513	216.5	3.2
		50	42,532	212.9	72,157	216.0	3.1
		10	33,190	211.8	57,636	214.6	2.8
		2	22,029	210.2	39,833	212.6	2.4
Fort Miller	2980	100	48,609	121.7	80,029	124.7	3.0
		50	44,721	121.3	74,437	124.2	2.9
		10	34,815	120.2	59,280	122.8	2.6
		2	23,087	118.7	40,900	120.9	2.2
Stillwater	3773	100	60,046	89.5	91,963	92.0	2.6
		50	55,112	89.0	85,210	91.5	2.5
		10	42,790	87.9	67,077	90.1	2.2
		2	28,376	86.3	45,883	88.2	1.8

[3] Flow regulation conditions were those for the 750-foot winter maximum drawdown settlement scenario (settlement scenario with least amount of storage).

[4] Drainage area decreases due to diversion to Glens Falls Feeder Canal.

Location	Drainage Area (sq. mi.)	Recurrence Interval	Flow Regulation[3]		Run-of-River		
			Flow (cfs)	Elevation (ft)	Flow (cfs)	Elevation (ft)	Difference (ft)
Upper	4500	100	71,976	81.7	103,283	84.6	2.9
Mechanicville		50	65,751	81.0	95,420	83.9	2.9
		10	50,707	79.4	74,577	81.9	2.6
		2	33,575	77.2	50,664	79.4	2.2
Lower	4572	100	73,233	53.9	104,381	55.9	2.0
Mechanicville		50	66,877	53.4	96,432	55.4	2.0
		10	51,537	52.2	75,362	54.0	1.8
		2	34,103	50.7	51,176	52.2	1.5
Waterford	4611	100	73,922	35.4	104,980	37.6	2.3
		50	67,495	34.8	96,983	37.1	2.2
		10	51,992	33.6	75,788	35.5	1.9
		2	34,391	31.9	51,454	33.5	1.6
Green Island	8090	100	152,901	27.9	192,829	30.3	2.4
(Troy)		50	140,831	27.2	176,937	29.4	2.2
		10	110,862	25.2	135,613	26.8	1.7
		2	75,012	22	90,668	23.7	1.2
Albany	8090	100	NA	20.1	NA	22.2	2.1
		50	NA	17.8	NA	20.6	2.8
		10	NA	13.1	NA	16.8	3.7
		2	NA	8.8	NA	12.4	3.6
Southern Corporate	----	100	NA	16.4	NA	18.0	1.6
Limits-Towns of		50	NA	14.6	NA	16.8	2.2
Schodack/Coeymans		10	NA	11.0	NA	13.8	2.8
		2	NA	7.7	NA	10.4	2.7

Figure 2: Derivation of Damage CDF from Discharge CDF, Rating Function, and Elevation-Damage Function (Source: ASCE Handbook of Hydrology).



3.5 Waste Assimilation

Flow releases from Great Sacandaga Lake during the summer months provide the majority of flows necessary for waste assimilation. The flow that is commonly used in determining wastewater treatment needs to maintain water quality (i.e. permit wastewater dischargers) is the minimum average 7 consecutive day low flow with a 10-year recurrence interval (MA7CD10). The NYSDEC's Upper Hudson River Waste Assimilative Model, which is used to permit wastewater discharges, is based on a flow of 1760 cfs at Hadley Falls. The flows used by the NYSDEC in its Upper Hudson River Waste Assimilation Model are the sum of an average of the 5-day weekday flow plus the historically 2-day low flow weekend period. The HEC-5P operations model was used to determine the MA7CD10 flow in the Hudson River at different locations for run-of-river operation. The wastewater treatment plants on the Upper Hudson River, downstream of Great Sacandaga Lake, would have to provide additional treatment to meet water quality standards under this lower flow if Great Sacandaga Lake did not exist.

Table 3 compares the flows used by the NYSDEC in their waste assimilative model with the MA7CD10 computed by the HEC-5P model for run-of-river conditions at different locations along the Hudson River.

Table 3: Waste Assimilative Design Flows for Existing Flow Regulation and Run-of River Operation

Location	Drainage Area	Existing Regulation (NYSDEC Regulatory Flow)	Run-of-River (MA7CD10)
Hadley Falls	2,719	1,760	470
Fort Miller	2,980	1,764	524
Upper Mechanicville	4,500	1,952	863
Green Island	8,032	3,013	1,846

This information was provided to the NYSDEC who then used it with their Upper Hudson River Waste Assimilative Model to predict what the new pollutant permit loadings would be at each treatment plant based on the lower streamflows for run-of-river operation (see Appendix E). The additional cost to maintain stream standards between regulated flows and run-of-river flows is the flow regulation benefit for waste assimilation.

DEC's waste assimilative model is divided into 3 segments. Segment 1 is from Palmer Falls Dam (mile point 218) to Stillwater Dam (mile point 168). Segment 2 is from Stillwater Dam (mile point 168) to Troy Lock (mile point 154). Segment 3 is from Troy Lock (mile point 154) to mile point 123, the location of the next dissolved oxygen sag.

In order to maintain the same existing water quality under run-of-river conditions with respect to dissolved oxygen, existing permit loads for biochemical oxygen demand (BOD) and nitrogenous oxygen demand (NOD) would have to be reduced 60% in segment 1, 35% in segment 2, and 25 % in segment 3. Table 4 lists the major wastewater dischargers of BOD and NOD, their permitted and actual discharges, their permitted and actual BOD and NOD loadings, and their reduced BOD and NOD loadings for run-of-river operation.

To calculate the expected pollutant loadings for dischargers who operate below permit discharges, it was necessary to prorate the past year's effluent loadings by the ratio of the maximum permitted discharge and actual discharge. This is considered a conservative assumption for BOD and NOD because it is likely that pollutant loadings would actually be higher at higher discharges because removal efficiency rates would decrease. Based on these assumptions, each wastewater discharger was evaluated to see if additional treatment was needed to reduce pollutants for run-of-river conditions.

DEC regulatory permit personnel were interviewed to identify the existing treatment processes employed at each wastewater treatment plant. Table 4 lists those wastewater discharges that would require additional treatment to maintain existing water quality for run-of-river conditions and the pollutants whose loadings would need to be reduced.

If additional treatment was necessary, the capital and operation and maintenance costs were calculated from EPA cost curves for all of the treatment processes. The costs on the EPA cost curves are a function of discharge and do not take into account influent or effluent pollutant concentrations, removal efficiencies, redundancies in a treatment plant, etc. The EPA cost curves are intended for planning or comparison purposes and are not meant to be the absolute answer.

It was assumed that additional BOD treatment would be provided by a biotower and additional NOD treatment by providing a separate activated sludge chamber for nitrification.

3.6 Whitewater Recreation

The benefit of whitewater recreation was determined by the unit day value method. The annual benefit of flow regulation was based on the number of whitewater trips and the average willingness to pay of whitewater users for the Sacandaga River whitewater experience.

In the Stewarts Bridge license application, the Niagara Mohawk River Power Corporation[5] (NMPC) published the number of commercial whitewater boating trips for the years 1993-1996. The Whitewater River Manager was contacted to update the number of boating trips for 1997-1999. A review of this data indicated that the number of commercial whitewater trips is fairly constant, around 30,000 boating trips per year. In previous reports, estimates of the number of private whitewater trips per year have varied anywhere between 1,000 and 10,000 trips per year.

In the NMPC Response to the FERC Additional Information Request Item No. 13 for the E.J. West Project on Whitewater Recreation (1993), it was estimated that the direct expenditures on whitewater recreation on the Sacandaga River of a commercial trip including the rafting trip fee, lodging/camping, food, transportation, and souvenirs (e.g. photos, tee shirts, etc.) was $35 per day and for a private trip was $20 per day. These values have been updated to 2001 by using the CPI. Based on this method, the economic benefit in 2001 for whitewater recreation in the Sacandaga River is $43 /day for a commercial trip and $25/ day for a private trip.

[5] Predecessor to Erie Boulevard Hydropower.

Table 4: Hudson River Sewage Treatment Plant Discharges and BOD and NOD Loadings for Flow Regulation and Run-of-River Operation

Discharge	STP Flow (MGD)	Actual Flow* (MGD)	Permit BOD (#/day)	Effluent BOD (#/day)	Reduced BOD (for ROR #/day)	Expected BOD (#/day)	Permit NOD (#/day)	Effluent NOD (#/day)	Reduced NOD for ROR (#/day)	Expected NOD (#/day)	Notes
Trans-Canada	10.3	6	16127	5256	6450	9022	0	0	0		BOD reduction needed
Corinth (V)	0.6	0.61	300	174	120	174	450	0	180	no data	BOD reduction needed
Finch Pruyn	17.5	18.2	67502	18425	27801	18425	24432	12109	9773	12109	NOD reduction needed
Encore Paper	2.2	2.03	10810	6178	4324	6695	0	0	0	0	BOD reduction needed
Glens Falls (C)	9.5	5.1	3150	302	1260	563	9600	719	3840	1340	
GE Ft. Edward	0.216	0.162	500	16	200	21.3	48	13.7	19.2	18.3	
Irving Tissue (Scott Paper)	3.2	0.64	6400	1400	2560	7000	0	0	0	0	BOD reduction needed
Washington Co. SD #2	2.5	2.3	934	374	374	407	1870	1036	748	1126	BOD & NOD reduction needed
H&V Easton Mill (Paper Mill)	1.9	2.3	590	187	236	187	0	0	0	0	
Schuylerville (V)	0.25	0.367	100	38.6	40	38.6	190	no data	76	no data	
Stillwater (V)	0.301	0.3	112	17	73	17	225	94	146	94	
Saratoga Co. SD #1	21.3	10.4	8000	1328	5200	2720	15900	3255	10335	6666	
GE Waterford	30.0	30.6	10000	1665	6500	1665	0	475	0	475	NOD removal needed
Albany North	35.0	22.7	10946	663	8210	1022	20277	4338	15208	6689	
Albany South	25.0	21.6	7819	1063	5864	1231	14674	1938	11006	2295	
Rensselaer Co. SD #1	24.0	19.3	7506	1611	5629	2003	14636	5959	10977	7410	
East Greenbush	2.5	1.9	938	428	704	563	1906	1126	1430	1481	NOD removal needed
Bethlehem	4.9	4.5	1839	270	1379	294	3735	274	2801	299	

*Discharge and effluent loadings for period 4/00 to 3/01

4.0 Results

4.1 Increased Real Estate Values for Lakeshore Property

A real estate appraisal of lakeshore property values is necessary to determine the flow regulation benefit.

4.2 Lake Recreation

According to deSeve report (1984), the total direct lake related expenditures by day users, seasonal residents, and boaters are $16.8 million/year. Based on the CPI, this figure in 2001 dollars is $28.7 million/year.

4.3 Hydroelectric Power Generation

The benefit of hydroelectric generation was evaluated using the HEC-5P operations model. The amount of generated electricity is converted into dollars by multiplying the monthly MWh by the price per MWh. Table 5 shows the difference in annual average energy generation in MWh for peak and non-peak periods. The benefit of flow regulation is the difference in the energy produced under flow regulation and by run-of-river operation. The hydroelectric benefit of flow regulation by project owner, in 2001 dollars, is also shown in Table 5. The total hydroelectric benefit for all projects combined is $ 15.1 million/year.

Table 5: Difference in Annual Power Generation for Flow Regulation and Run-of-River Operation

Owner	Difference in Peak Energy (MWH)	Difference in Off-Peak Energy (MWH)	Total Annual Replacement Cost ($)
Erie Boulevard Hydropower	(114,239)	(23,363)	($8,224,557)
Curtis/Palmer Hydroelectric	(30,387)	(29,524)	($3,019,307)
Finch Pruyn	(5,314)	(5,127)	($522,231)
Adirondack Hydro	(23,018)	(22,237)	($2,268,108)
Mercer Companies	(2,616)	(2,508)	($256,979)
Stillwater Hydro	(965)	(925)	($96,016)
NYSEG	(5,075)	(4,899)	($482,962)
Fourth Branch Associates	(1,241)	(1,199)	($125,952)
Green Island Power Authority	(1,439)	(1,380)	($134,617)
Total	**(184,294)**	**(91,162)**	**($15,130,729)**

4.4 Flood Protection

Flood control was the major impetus for the original construction of Great Sacandaga Lake. The District contracted with the NYSDEC to calculate the flood damages for the 2, 10, 50, and 100 year flood events (see Table 6). The average annual flood damage for each case is equal to the area under the damage probability curve. The annual flood protection benefit (i.e. damage reduction) is the difference in the annual flood damages determined with and without flow regulation.

Table 6: Flood Damages for Entire Study Area under Flow Regulation and Run-of-River Operation

Flood Event	Flood Damages (Flow Regulation)	Flood Damages (Run-of-River Operation)
2-year	$84,406,588	$173,974,737
10-year	$105,978,378	$261,522,836
50-year	$133,026,270	$305,549,654
100-year	$145,055,264	$339,763,812

The average annual flood damages under flow regulation and run-of-river operation are $49,027,587 and $113,008,981, respectively. For all municipalities analyzed, the total annual flood protection benefit is $63,981,395 in 2001 dollars. The annual flood protection benefit by municipality is listed in Table 7.

Table 7: Annual Flood Protection Benefit by Municipality

Municipality	Annual Flood Protection Benefit
City of Albany	$8,768,385
City of Cohoes	$207,426
City of Mechanicville	$243,149
City of Rensselaer	$2,552,199
City of Troy	$727,424
City of Watervliet	$23,369
Town of Bethlehem	$31,486,852[6]
Town of Coeymans	$219,326
Town of Colonie	$81,594
Town of Corinth	$60,329
Town of East Greenbush	$663,864
Town of Easton	$4,964
Town of Fort Edward	$9,555
Town of Greenwich	$62,539
Town of Hadley	$142,107
Town of Halfmoon	$982,474
Town of Moreau	$85,445
Town of New Baltimore	$257,766
Town of North Greenbush	$826,804
Town of Northumberland	$3,867
Town of Queensbury	$223,799
Town of Saratoga	$101,363
Town of Schaghticoke	$174,390
Town of Schodack	$133,051
Town of Stillwater	$234,114
Town of Stuyvesant	$18,744
Town of Waterford	$1,352,139
Village o Castleton-on-Hudson	$1,392,484
Village of Corinth	$2,733,982
Village of Fort Edward	$162
Village of Green Island	$29,779
Village of Hudson Falls	$0
Village of Menands	$5,666,464
Village of Schuylerville	$459,284
Village of South Glens Falls	$1,252,286
Village of Stillwater	$2,658,402
Village of Waterford	$141,516
Total	**$63,981,395**

[6] The Town of Bethlehem accounts for approximately 49% of annual flood protection benefits due principally to flood benefits received at a Niagara Mohawk fossil fuel generating station, which is valued at $267 million.

4.5 Waste Assimilation

Flow releases from Great Sacandaga Lake during the summer months provide the majority of flows necessary for waste assimilation.

Table 8 shows the incremental capital cost and annual operating and maintenance cost for additional wastewater treatment to maintain existing water quality between run-of-river operation and existing flow regulation. The capital cost to reduce BOD and NOD loadings in the Hudson River in 2001 dollars is $56.3 million, which amortized assuming a 20-year useful life and 5% bond rate for municipal plants and a 10-year useful life and 8% interest rate for industrial plants, is an annual cost of $7.7 million. The operations and maintenance cost to reduce BOD and NOD loadings is $1.4 million. Therefore, the annual cost to reduce BOD and NOD is $9.1 million/year in 2001 dollars.

Table 8: Cost of Additional Biological Wastewater Treatment for Run-of-River Conditions to Reduce BOD and NOD

Discharge	Pollutants to be Removed	Treatment Processes	Capital Cost	Annualized Capital Cost	Annual O & M Cost	Total Annual Cost
Trans-Canada	BOD, phenols	biotower	$12,762,538	$1,901,618	$335,627	$2,237,245
Corinth	BOD	biotower	$1,491,430	$119,762	$32,522	$152,284
Finch Pruyn	NOD, phenols	nitrification	$10,568,921	$1,574,769	$70,957	$1,645,726
Encore Paper	BOD	biotower	$2,914,549	$434,268	$74,150	$508,418
Irving Tissue	BOD	biotower	$4,298,960	$640,545	$105,371	$745,916
Washington County S.D. #2	BOD	biotower	$3,169,397	$254,503	$83,256	$337,759
Washington County S.D. #2	NOD	nitrification	$2,536,541	$203,684	$107,977	$311,661
General Electric - Waterford	NOD	nitrification	$16,064,760	$2,393,649	$462,760	$2,856,409
East Greenbush	NOD	nitrification	$2,536,541	$203,684	$107,977	$311,661
Total			$56,343,637	$7,726,482	$1,380,597	**$9,107,079**

Note: Capital cost for municipal plants amortized assuming 5% bond rate and 20-year return period. Capital cost for industrial plants amortized assuming 8% interest rate and 10-year return period.

4.6 Whitewater Recreation

Without Great Sacandaga Lake, it is unlikely that there would be whitewater recreation in the Sacandaga River in any season other than the spring. The Reservoir provides the majority of the streamflow in the popular summer season on a predictable schedule. Without the Reservoir, summer streamflows would be on the order of 300 cfs (the median August unregulated flow would be 294 cfs). The optimum whitewater flow according to studies by NMPC (1993) for relicensing is 4000 cfs.

Based on the annual number of daily Sacandaga River whitewater boating trips and the economic benefit per trip, the annual benefit of commercial whitewater recreation is $1,050,000 and the annual benefit of private whitewater recreation can vary between $25,000 and $250,000. Therefore, the total benefit, in 2001 dollars is $1,075,000/year to $1,300,000/year.

4.7 Water Supply

Although summer flow releases from Great Sacandaga Lake improve downstream water quality and, therefore, are a benefit to water supply treatment, the benefit is much smaller than other benefits to be studied. Decreased summer flow under a natural flow regime would result in increased treatment costs for coagulation/sedimentation, sludge handling, chlorination, and chloride removal.

The Malcolm Pirnie Report (1984) estimated that the costs for these increased processes for a reduction in the MA7CD10 flow of 260 cfs to be $16,100. Assuming that we saw a fivefold decrease in the MA7CD10 flow of approximately 1290 cfs (this is the difference at Hadley between 1760 cfs for existing regulation and 470 cfs for run-of-river operation), the 1984 cost would be approximately $80,500. Escalated by the CPI, the 2001 cost would be $137,524/year. The benefit of avoiding this cost is small compared to some of the more significant benefits.

4.8 Downstream Water Recreation

The benefit of flow regulation on downstream water recreation is unclear for several reasons. First, it would be difficult to quantify the differences in water recreation use. Although flows in the river would be less in the summer for run-of-river operation as compared to flow regulation, there would still be water in the river and the impoundments behind the existing dams would still be present. To be consistent with the analysis of waste assimilation benefits, it is assumed that existing water quality would be maintained for run-of-river operation and be suitable for water-based recreation. Therefore, assuming water depths were suitable for boating and water quality was suitable for swimming and fishing, recreation use is not expected to be significantly different for run-of-river operation than flow regulation.

4.9 Downstream Fisheries Enhancement

The economic benefit of fisheries enhancement in the Sacandaga and Hudson Rivers is believed to be small and may be offset by negative effects to fisheries created by other beneficiaries' uses such as hydroelectric power generation and whitewater boating. Therefore, this economic benefit has not been quantified in this report.

4.10 Navigation

Navigation benefits from flow regulation are considered small when compared to the other benefits. By law, the NYSDOT has first priority for Hudson River flows up to a monthly average of 150 cfs to be diverted to the Glens Falls Feeder Canal. This flow augments lockage water for the Champlain Canal from April to December. About 25 % of diverted water returns to the Hudson River (Malcolm Pirnie, 1984).

"The actual average amount of diversion is about 100 cfs" (Malcolm Pirnie, 1984). Unregulated flows in the Hudson River would exceed the 150 cfs diversion requirement. Therefore, no benefit is derived from regulation of Great Sacandaga Lake.

The only navigation benefit derived from the Great Sacandaga Lake is that it improves the sediment transport of the Hudson River by increasing the quantity of summer flows. This has the effect of decreasing the maintenance dredging requirements of the Champlain Canal which functions with diverted Hudson River flows. M-P estimated in 1984 that the annual increased dredging cost to remove 600 cubic yards of sediment due to lower flows would be $12,000. This value updated to 2001 by the CPI is $20,524/year. The benefit of avoiding this cost due to releases from Sacandaga River is small compared to other benefits.

5.0 Summary

The most significant benefits due to regulation of Hudson River flows are increased real estate values for lakeshore property, flood protection, lake recreation, hydroelectric power generation, wastewater assimilation, and whitewater recreation. Water supply, downstream recreation, fisheries enhancement, and navigation are relatively small benefits compared to the significant benefits. Table 9 summarizes the annual dollar value of the benefits we have identified.

Table 9: Summary of Annual Benefits of Flow Regulation from Great Sacandaga Lake

Benefit	Annual Value
Increased Real Estate Values for Lakeshore Property	*Further Study Required*
Flood Protection	$64.0 million
Lake Recreation	$28.7 million
Hydroelectric Power Generation	$15.1 million
Waste Assimilation (for BOD and NOD)	$9.1 million
Whitewater Recreation	$1.1-1.3 million
Water Supply	$0.1 million
Downstream Water Recreation	-
Downstream Fisheries Enhancement	-
Navigation	$0.02 million

6.0 Benefit Apportionment Schedule for Hudson River Flow Regulation

The District's present assessment schedule allocates 95% of their costs to hydroelectric generation beneficiaries and 5% to municipalities for flood control benefits.

The following apportionment schedule in Table 10 is based on the benefits that have been quantified to date. This schedule will change if the benefits for increased real estate values are quantified.

Table 10: Benefit Apportionment Schedule

Benefit Category	Annual Value	Percentage
Flood Protection	$64.0 million	54.14%
Lake Recreation	$28.7 million	24.28%
Hydroelectric Power Generation	$15.1 million	12.77%
Waste Assimilation (for BOD and NOD)	$9.1 million	7.70%
Whitewater Recreation	$1.2 million	1.02%
Water Supply	$0.1 million	0.08%
Downstream Water Recreation	-	
Downstream Fisheries Enhancement	-	
Navigation	$0.02 million	0.02%
Total Benefits	**$118.2 million**	100.00%

The information in Table 10 was apportioned further by the individual beneficiaries within each benefit category. This analysis was completed for the lake recreation, flood protection, hydroelectric power generation, waste assimilation, and whitewater recreation benefit categories. The analysis was not conducted for water supply and navigation, as these benefits are relatively minor. The purpose of the analysis was to determine each individual beneficiary's payment percentage.

For lake recreation, the benefit associated with this category was apportioned between Fulton and Saratoga Counties, which surround Great Sacandaga Lake. The apportionment was based on a ratio of lake surface area between the two counties. Flood protection benefits were apportioned by municipality based on the estimated damage that would have occurred (Table 7). Hydroelectric generation benefits were apportioned by project owner based on the percentage of annual replacement costs (see Table 5). For waste assimilation, the benefits were apportioned by discharger based on the annual cost of additional biological wastewater treatment to reduce BOD and NOD. Whitewater recreation benefits were apportioned between commercial (30,000 user-days) and private (10,000 user-days) use based on user-days (see Section 3.6). Table 11 illustrates the results of this analysis.

Table 11: Apportionment Schedule for Individual Beneficiaries

Benefit Category	Individual Beneficiary within Category	% by Benefit Category (see Table 10)	% of Benefit within Category	% of Total Payment from Individual Beneficiary
Flood Protection	City of Albany	54.14%	13.70%	7.42%
	City of Cohoes		0.32%	0.18%
	City of Mechanicville		0.38%	0.21%
	City of Rensselaer		3.99%	2.16%
	City of Troy		1.14%	0.62%
	City of Watervliet		0.04%	0.02%
	Town of Bethlehem		49.21%	26.64%
	Town of Coeymans		0.34%	0.19%
	Town of Colonie		0.13%	0.07%
	Town of Corinth		0.09%	0.05%
	Town of East Greenbush		1.04%	0.56%
	Town of Easton		0.01%	0.00%
	Town of Fort Edward		0.01%	0.01%
	Town of Greenwich		0.10%	0.05%
	Town of Hadley		0.22%	0.12%
	Town of Halfmoon		1.54%	0.83%
	Town of Moreau		0.13%	0.07%
	Town of New Baltimore		0.40%	0.22%
	Town of North Greenbush		1.29%	0.70%
	Town of Northumberland		0.01%	0.00%
	Town of Queensbury		0.35%	0.19%
	Town of Saratoga		0.16%	0.09%
	Town of Schaghticoke		0.27%	0.15%
	Town of Schodack		0.21%	0.11%
	Town of Stillwater		0.37%	0.20%
	Town of Stuyvesant		0.03%	0.02%
	Town of Waterford		2.11%	1.14%
	Village o Castleton-on-Hudson		2.18%	1.18%

Benefit Category	Individual Beneficiary within Category	% by Benefit Category (see Table 10)	% of Benefit within Category	% of Total Payment from Individual Beneficiary
	Village of Corinth		4.27%	2.31%
	Village of Fort Edward		0.00%	0.00%
	Village of Green Island		0.05%	0.03%
	Village of Hudson Falls		0.00%	0.00%
	Village of Menands		8.86%	4.79%
	Village of Schuylerville		0.72%	0.39%
	Village of South Glens Falls		1.96%	1.06%
	Village of Stillwater		4.15%	2.25%
	Village of Waterford		0.22%	0.12%
Lake Recreation	Saratoga County	24.28%	30.24%	7.34%
	Fulton County		69.76%	16.94%
Hydroelectric Generation	Erie Boulevard Hydropower	12.77%	54.81%	7.00%
	Curtis/Palmer Hydroelectric		20.12%	2.57%
	Finch Pruyn		3.48%	0.44%
	Adirondack Hydro		15.12%	1.93%
	Mercer Companies		1.71%	0.22%
	Stillwater Hydro		0.64%	0.08%
	NYSEG		3.22%	0.41%
	Four Branch Associates		0.84%	0.11%
	Green Island Power Authority		0.90%	0.11%
Waste Assimilation	Trans-Canada	7.70%	24.57%	1.89%
	Corinth		1.67%	0.13%
	Finch Pruyn		18.07%	1.39%
	Encore Paper		5.58%	0.43%
	Irving Tissue		8.19%	0.63%
	Washington County S.D. #2		7.13%	0.55%
	General Electric - Waterford		31.36%	2.41%
	East Greenbush		3.42%	0.26%
Whitewater Recreation	Commercial	1.02%	75.00%	0.76%
	Private		25.00%	0.25%
Total		**100%**		**100%**

7.0 Recommendations

The benefits of increased real estate values for lakeshore property and waste assimilation are significant enough to warrant further study prior to revising the District's assessment schedule of benefits. Although, the District charges access permit fees[7] for properties around Great Sacandaga Lake, these mostly cover the administrative cost of the program and not the benefit of flow regulation. We recommend that the District contract with New York State's Division of Equalization and Assessment Department or a real estate appraisal firm to determine the benefit of increased real estate values. The most comprehensive level of study would be to compile a list of all the lakefront properties and their assessed values from the tax records of local municipalities or counties. In order to calculate the benefit of the reservoir's presence, the value of these lakefront properties would be compared to similar type properties in nearby areas that are not located on a lake. The difference between the real estate value of property with and without Great Sacandaga Lake frontage would be the net benefit. The level of effort required for this type of study is extensive.

A lower level of effort might be to study 5 or 6 types of property in one community to see the difference between property values with and without the reservoir. These results could then be applied to properties in the other communities as well. The drawback to this approach is that it uses a much smaller sample size than the first alternative and may be more subject to criticism.

The waste assimilative benefits appear to be a large benefit that warrants further study if the District wishes to assess the beneficiaries. The analysis conducted for the waste assimilative benefit was at a planning level, particularly in the case of toxics. Additional study, if pursued, should refine and make more site-specific the EPA cost curves used to determine the removal of pollutants.

[7] The District owns all land up to approximately elevation 778 (7 feet above spillway crest). Permit holders are people who own land adjacent to the lake who use the lake by access to the District's land with a permit.

UPPER HUDSON RIVER
PRELIMINARY FLOOD IMPACT ECONOMIC ANALYSIS

(AUGUST 2002)

PURPOSE

The purpose of this study was to make a preliminary determination of the economic impact of the Hudson River's flood waters on the surrounding areas within Saratoga, Warren, Washington, Rensselaer, and Albany counties. The flood events studied included the 100 year event (1% annual chance flood) with the influence of the Great Sacandaga Lake and the 100 year event without the influence of the Great Sacandaga Lake.

STUDY AREA

The study area included a stretch of the Hudson River beginning at Lake Luzerne, in the towns of Hadley and Lake Luzerne, NY; and ending just south of the Dunn Memorial Bridge in the cities of Albany and Rensselaer, NY (see Figure 1.) The total length of the Hudson River studied was 131,162 meters, or approximate 81.5 miles. Fifteen sites along this stretch of the river provided flow data in cubic feet per second, and elevations in feet.

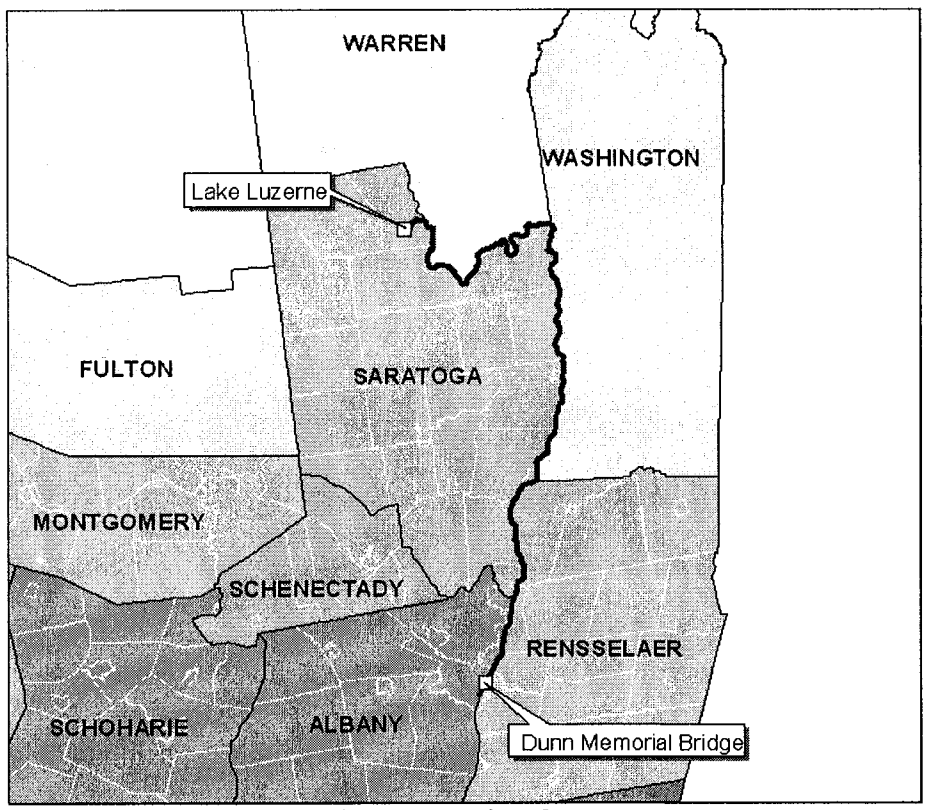


Figure 1. Project Scope

SOFTWARE

The majority of the analysis performed in this study was done using geographic information systems (GIS) software. Specifically, ESRI©'s ArcView v.3.2 software package was used, with the addition of ESRI©'s Spatial Analyst v.1.1 extension. Digital data for this study can be found in one of the following formats: ArcView shapefile; ESRI© Grid; or MrSID image.

DATA

A variety of pre-existing and newly developed data sets were used in this study. Below is a list of those data sets, with a description of their development and usage. The projection used in this study was Universal Transverse Mercator (UTM) zone 18. The horizontal datum was NAD83, GRS80 spheroid.

Color Balanced Ortho-imagery

The ortho-imagery depicts ground conditions as shown on aerial imagery taken within the period 1994 through 1999. The original digital ortho-imagery was produced under the federal Digital Ortho-Photography Quarter Quadrangle Program and New York State Department of Environmental Conservation. Department of State enhanced the ortho-imagery as part of New York State's Y2K preparedness planning effort. The imagery was used as the base map.

For more information: http://www.nysgis.state.ny.us/gis3/data/dos.doqq_orthos.html

Hudson River Hydrography

The source of this data was the 1:24000 statewide hydrography. The hydrography is a single line representing the channel. The data was manually modified to align with the ortho-imagery. After cleaning the channel's topology, left and right banks were calculated, along with a perimeter. These data sets were used in both the GIS and Engineering Methodologies for determining the flood extents. These methodologies are described later in this report.

10 meter Digital Elevation Models (DEMs)

A DEM is a collection of data that consist of points arrayed in a grid over a particular geographic extent. Each point in a DEM will always contain an X, Y, and Z value. The 10 meter DEMs are at a scale of 1:24000 and have a horizontal spacing of 10 meters, and a vertical accuracy (for the study area) of approximately +/- 2 meters(+/- 6 feet).

The10 meter digital elevation models were joined together to form one elevation model for the entire study area. A hillshade model was calculated from the elevation model. The elevation data was used in determining the flood extents.

Office of Real Property Parcel Centroids

This data set contains point features and attributes for real property tax parcels by county. These points represent the visual center of the parcel on a tax map. The points and associated attributes were extracted from local government assessment rolls. The data is developed by local governments for assessing real property tax parcels. The points represent a spatial address that can be used for mapping and analysis. Although the data is developed for the purpose of real property tax administration, the ability to map parcel centroids along with the associated assessment information creates the opportunity to use the data for many other purposes.

For more information: http://www.nysgis.state.ny.us/gis3/data/orps.rpsdata00.html

The data used for the study was for the year 2000. There were 6,655 parcel centroids in the general study area. From these centroids, there were 119 unique property classifications. It was necessary to reclassify the data in order to simplify it for the economic analysis. The final classifications used in the study included:

- Single story, residential
- Split level, residential
- Two story, residential
- Mobile, residential
- Commercial
- Converted residence
- Warehouse
- Agriculture

Additional fields were added to the database to facilitate the re-classification.

The ORPS centroids acted as the main input for the economic analysis. The data set contains a field with a dollar value, determined by the municipality, for the land and for the land and structure. From these two fields, a third was added, representing strictly the structure value. Figure 2 is a graphical representation of the spatial distribution of the structure value of all those properties included in the flood extents.

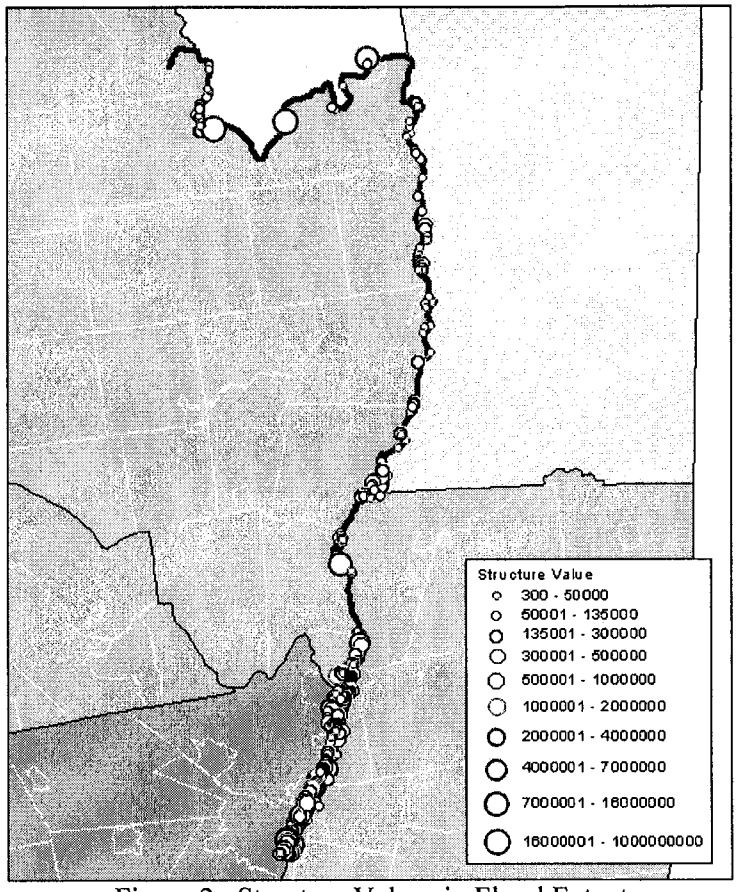


Figure 2. Structure Values in Flood Extent

It is important to note that the centroids were not spatially corrected to represent the location of the structure. There may be cases where a property was included in the study, but the structure that resides on that property actually fell outside the flood extent. Alternatively, there may be cases where a property was excluded from the study, but the structure that resides on that property actually fell inside the flood extent.

Dams

The fifteen dams used in the study were extracted from NY State Department of Environmental Conservation's Water Division, Dam Safety section's statewide dam database. The dams were then spatially re-oriented to match the ortho-imagery and the DEMs.

FLOOD EXTENT DETERMINATION

Two flood extents were calculated for the study area. The first was the 100 year flood event (1% annual chance flood) with the influence of the Great Sacandaga Lake and the 100 year event without the influence of the Great Sacandaga Lake.

Table 1 shows the discharge and elevation data used for the 100 year flood event with and without Great Sacandaga Lake provided by the District for the flood extent determination. Flood discharges and elevations for the 100 year event for with and without Great Sacandaga Lake were predicted from the HEC5P operations model developed by the District.

Table 1
Discharge and Elevation Data at each Dam

DAM	Drainage Area (sq.mi.)	With Great Sacandaga Lake (Settlement 750) Z50_FLOW Flow (cfs)	Z50_ELEV Elev.(ft.)	Without Great Sacandaga Lake (Run-of-River) ROR_FLOW Flow (cfs)	ROR_ELEV Elev.(ft.)
Hadley (Lake Luzerne)	2719	44661		75889	
Curtis (Corinth)	2760	45568	553.37	76749	555.37
Palmer Falls (Corinth)	2760	45568	531.94	76749	536.38
Spiers Falls	2779	45585	443.38	76749	446.76
Sherman	2810	46019	359.36	77352	362.31
Feeder Dam	2811	45983	291.59	77312	295.1
South Glens Falls/ Finch Pruyn	2807	45967	274.38	77296	277.02
Hudson Falls	2821	46180	213.34	77513	216.52
Fort Miller	2980	48609	121.74	80029	124.72
Stillwater (Stillwater)	3773	60046	89.46	91963	92.02
Upper Mechanicville	4500	71976	81.68	103283	84.61
Lower Mechanicville	4572	73233	53.86	104381	55.90
Waterford	4611	73922	35.35	104980	37.62
Green Island (Troy)	8090	152901	27.94	192829	30.33
Albany Estuary (estimate)	0	0	20.1	0	22.2

Both flood extents were calculated using the following **GIS Methodology**. This methodology consisted of using the change in elevation values to fill the DEM.

1. Map panels were created for each one of the dam sites. Each map panel would contain the dam, and extend upstream to just beyond the next dam. (Figure 3.)

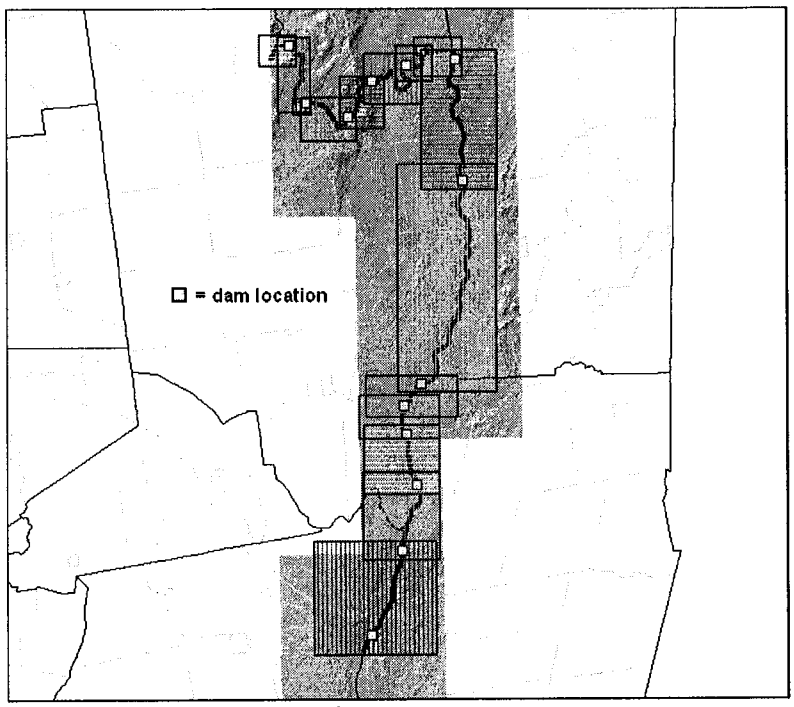


Figure 3. Grid Paneling Scheme

2. Using the panels, individual elevation grids were extracted from the master merged grid.
3. For each dam, the normal surface water elevation was calculated and populated into the [ELEVFT] field. This value was then subtracted from the surface water elevations in the [Z50_FLOW] and [ROR_FLOW] field. The results were converted to meters, and stored in the [Z50_DIF_M] and [ROR_DIF_M] fields.
4. For each elevation grid extract made in step 3., two grid-filling operations were performed. One for each value in ([Z50_DIF_M] + [ADDMETER]) and ([ROR_DIF_M] + [ADDMETER]). The [ADDMETER] field represents the +/- 2 meter vertical accuracy of the 10 meter DEM. An optimal value was chosen from this range to reflect the real world elevation. The programming code used to fill the grid can be found in Appendix II of this study.
5. The grid filling output for each panel of a particular flood event was merged together. The end product was two polygon flood extents, one for With Great Sacandaga Lake and one for Without Great Sacandaga Lake.
6. To clean the flood extents they were buffered out by 300 feet and then back in by 300 feet. For a more involved discussion on the buffering technique, see Appendix III.

FLOOD EXTENT DETERMINATION METHODOLOGY QUALITY ASSURANCE

Approximately 40 miles of river was studied using a standard **engineering backwater methodology**. The purpose of this analysis was to use the output flood extent data as a quality assurance for the above described GIS Methodology.

The flood extents were developed using the Army Corps of Engineer's HEC – RAS (River Analysis System) v.2.2 software package. The modeling parameter and geometry were derived using GIS techniques and data sets. Cross section elevations were extracted from the 10 meter DEMs. The spacing between each cross section was set to 600 feet. Roughness factors (Manning's 'n') used in the model were obtained using semi-automated methods supported by GIS techniques. The 30 meter multi-resolution land cover (MRLC) data produced by EPA was used to estimate the roughness factors for the over-bank areas of the floodplain. The discharge values for each dam along the river are shown in Table 1. The effects of hydraulic obstructions, such as bridges and culverts, along the stream were not taken into consideration due to a lack of structure data.

The output of the engineering backwater methodology was compared to the output of the GIS methodology for the With Great Sacandaga Lake. For each extent, any area that exceeded that of the other extent was extracted. These two extractions were merged into one polygon. The extents themselves were then merged into a single polygon. The merged flood extent's total square miles was equal to 1.86709. The merged exceeding data's total square miles was equal to 0.24716. 86.77% of the flood extent area calculated using both methodologies was shared, while 13.23% was not. See Figure 4.

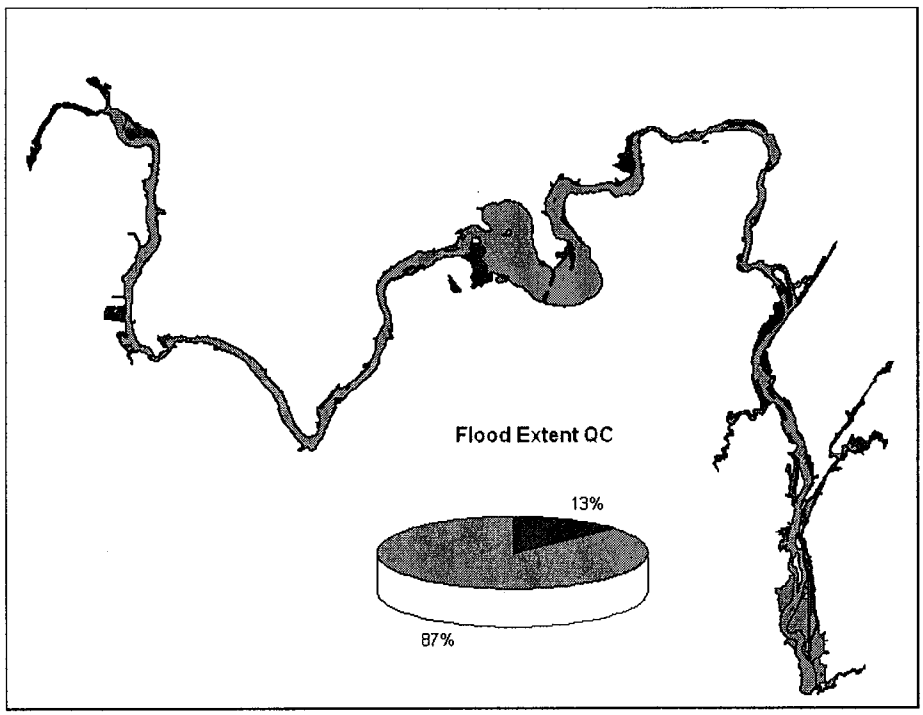


Figure 4. QC Output

ECONOMIC ANALYSIS

The economic analysis was performed in two parts. The first part consisted of applying a **structure** damage percentage to the structure value of all properties that fell within the flood extents. The second part consisted of applying a **content** damage percentage to the structure value of *only* residential properties that fell within the flood extents.

For the case With Great Sacandaga Lake, all properties that fell within the flood extent were assumed to have an average flood depth of 2 feet. For the case Without Great Sacandaga Lake, all properties that fell within the With Great Sacandaga Lake flood extent were assumed to have an average flood depth of 4 feet. The remaining properties that fell outside the With Great Sacandaga Lake extent but within the Without Great Sacandaga extent were assumed to have a flood depth value of 2 feet.

The flood depth percentages used came from a study done by the Army Corps of Engineers, Institute for Water Resources, titled *Depth-Damage Functions for Corps of Engineers Flood Damage Reduction Studies* (2001). The depth damage percentages in that study were statistically validated for residential structures without basements. The following depth damage tables are from the *Depth-Damage Functions for Corps of Engineers Flood Damage Reduction Studies* (2001) report.

Table 2
Damage for One Story, No Basement

Structure Damage:

Depth	Damage	Comments
-2	0%	No structure damage.
-1	2.5%	Some damage to garage, occasional foundation damage, damage to porches and decks.
0	13.4%	Damage to floors, carpets, buckled tile, and floor molding.
1	23.3%	The first four feet of drywall need replacement and the insulation and lower cabinets are damaged. Doors need replacement.
2	32.1%	Additional cabinet damage, plumbing fixtures are damaged.
3	40.1%	Reaches the top of the cabinet level.
4	47.1%	Reaches second layer of drywall.

Content Damage:

Depth	Damage	Comments
-2	0.0%	
-1	2.4%	Some damage to items in garage, or on the porch.
0	8.1%	Rugs ruined, furniture damage begins.
1	13.3%	Appliances are damaged.
2	17.9%	Much of the furniture is damaged.
3	22.0%	Clothes in the closet are damaged.
4	25.7%	Damage to items on countertops.

Table 3
Damage for Two Story, No Basement

Structure Damage:

Depth	Damage	Comments
-2	0%	
-1	3.0%	
0	9.3%	
1	15.2%	
2	20.9%	
3	26.3%	
4	31.4%	

Content Damage:

Depth	Damage	Comments
-2	0.0%	
-1	1.0%	
0	5.0%	
1	8.7%	
2	12.2%	
3	15.5%	
4	18.5%	

Table 4
Damage for Split Level, No Basement

Structure Damage:

Depth	Damage	Comments
-2	0%	
-1	6.4%	
0	7.2%	
1	9.4%	
2	12.9%	
3	17.4%	
4	22.8%	

Content Damage:

Depth	Damage	Comments
-2	0.0%	
-1	2.2%	
0	2.9%	
1	4.7%	
2	7.5%	
3	11.1%	
4	15.3%	

The average depths used in the study take into account the fact that depth damage percentages provided by the Corps account for structures without basements. This lowers the damage estimate, since a significant number of structures within the flood extent probably have basements, particularly those that are residential. The lowered estimate is balanced by the fact that first floor elevations were not considered.

Using the classifications listed in the ORPS data discussion, the most reasonable associations between classification type and damage percentage were made.

This study's property classifications and associated flood damage percentages can be seen in the Table 5 for **structure** damage, and Table 6 for **content** damage.

Table 5
Structure Damage

Property Class	Depth Damage Source Table (Structure)	2 Foot Damage %	4 Foot Damage %
Single story, residential	One Story, No Basement	32.10	47.10
Split level, residential	Split Level, No Basement	12.90	22.80
Two story, residential	Two Story, No Basement	20.90	31.40
Mobile, residential	One Story, No Basement	32.10	47.10
Commercial	One Story, No Basement (minus 1 ft)*	23.30	40.10
Converted residence	One Story, No Basement	32.10	47.10
Warehouse	One Story, No Basement (minus 2 ft)*	13.40	32.10
Agriculture	One Story, No Basement (minus 2 ft)*	13.40	32.10

* the "minus *n* ft" value was an adjustment made based on the property class. For example, the One Story, No Basement depth damage source table was used for the "Commercial" property class. However, it was decided that the structural damage would not be as high as that found in an actual residential property. As such, the 2 Foot Damage Percentage used is actually the equivalent to the 1 Foot Damage Percentage found in the original One Story, No Basement depth damage source table.

Table 6
Contents Damage

Property Class	Depth Damage Source Table (Content)	2 Foot Damage %	4 Foot Damage %
Single story, residential	One Story, No Basement	17.9	25.7
Split level, residential	Split Level, No Basement	7.5	15.3
Two story, residential	Two Story, No Basement	12.2	18.5
Mobile, residential	One Story, No Basement	17.9	25.7
Commercial	One Story, No Basement (minus 1 ft)*	13.3	22
Converted residence	One Story, No Basement	17.9	25.7
Warehouse	One Story, No Basement (minus 2 ft)*	8.1	17.9
Agriculture	One Story, No Basement (minus 2 ft)*	8.1	17.9

RESULTS

Table 7 shows the number of each property type that are flooded by the 100 year event with and without Great Sacandaga Lake.

Table 7
Property Type Count Flooded by the 100 Year Event
With and Without Great Sacandaga Lake

	With Great Sacandaga Lake	Without Great Sacandaga Lake
PROPERTY TYPE	COUNT	COUNT
Two story, residential	499	499
Agriculture	0	1
Commercial	234	332
Converted residence	4	9
Mobile, residential	51	54
Single story, residential	35	79
Split level, residential	4	6
Warehouse	52	504

(See Chart 1.1 and Chart 1.2 in Appendix IV)

Structure Damage Analysis

The **structure damage** values (in dollars) to the properties listed in Table 7 were calculated for the 100 year event for With and Without Great Sacandaga Lake. They are shown in Table 8.

Table 8
Structure Property Damage for With and Without Great Sacandaga Lake
For the 100 Year Event

	With Great Sacandaga Lake	Without Great Sacandaga Lake
Total	$25,480,531.76	$58,526,612.51
Number of properties	874	1554
Mean value	$29,153.93	$37,661.91
Maximum value	$3,041,861.60	$5,235,135.20
Minimum value	$0.00	$0.00

Content Damage Analysis

The content damage listed in Table 9 is that to **residential** properties for the 100 year event for With and Without Great Sacandaga Lake. Content damage analysis was only calculated for residential structures. Commercial structures were not included. The contents damage due to flooding of commercial structures could be significant.

Table 9
Structure Property Damage for With and Without Great Sacandaga Lake
For the 100 Year Event

	With Great Sacandaga Lake	Without Great Sacandaga Lake
Total	$2,456,087.51	$3,707,816.05
Number of properties	589	1142
Mean value	$4169.93	$4,611.42
Maximum value	$59658.00	$90,465.00
Minimum value	$53.70	$77.10

Total Damage Analysis

The combined damages (structure and content) for With Great Sacandaga Lake is:

27,936,619.27 Dollars US.

The combined damages (structure and content*) for Without Great Sacandaga Lake is:

62,234,428.56 Dollars US.

The difference between the two studies is the flood protection benefit for the 100 year event of Great Sacandaga Lake and is:

34,297,809.29 Dollars US.

The computed damages resulting from the 100 year storm for run-of-river and flow regulation scenarios in the August 2002 NYSDEC report differ from those reported in June 2003 for several reasons. An additional 13 miles of stream was added to the analysis. A review of the previous analysis indicated that several commercial properties were erroneously excluded. Contents damages for commercial properties were not included previously.

A breakdown by municipality of the flood damages reported as part of the revised June 2003 analysis for the 2, 10, 50, and 100 year events is shown on the following pages.

2 Year Flood-Flow Regulation				
Municipality	**Number of Properties**	**Structural Damage**	**Content Damage**	**Total Damages**
City of Albany	41	$2,299,441	$1,385,829	$3,685,270
City of Cohoes	17	$154,277	$90,943	$245,220
City of Mechanicville	20	$339,151	$195,080	$534,231
City of Rensselaer	80	$497,945	$293,986	$791,931
City of Troy	52	$313,991	$184,553	$498,543
City of Watervliet	1	$13,899	$8,113	$22,012
Town of Bethlehem	12	$34,292,398	$20,724,503	$55,016,901
Town of Coeymans	16	$260,657	$153,781	$414,437
Town of Colonie	1	$16,590	$10,028	$26,619
Town of Corinth	21	$120,873	$69,392	$190,265
Town of East Greenbush	18	$715,204	$430,517	$1,145,722
Town of Easton	19	$5,184	$2,911	$8,095
Town of Fort Edward	3	$8,769	$5,118	$13,887
Town of Greenwich	8	$100,557	$58,509	$159,066
Town of Hadley	13	$213,181	$118,876	$332,057
Town of Halfmoon	5	$1,050,952	$634,468	$1,685,420
Town of Moreau	42	$233,589	$131,859	$365,448
Town of New Baltimore	7	$282,767	$167,336	$450,103
Town of North Greenbush	2	$16,201	$9,457	$25,659
Town of Northumberland	1	$0	$0	$0
Town of Queensbury	35	$395,237	$224,349	$619,585
Town of Saratoga	21	$272,246	$153,966	$426,213
Town of Schaghticoke	47	$309,090	$177,446	$486,536
Town of Schodack	42	$204,865	$120,282	$325,147
Town of Stillwater	22	$404,380	$231,792	$636,172
Town of Stuyvesant	3	$0	$0	$0
Town of Waterford	3	$42,972	$24,090	$67,062
Village o Castleton-on-Hudson	9	$1,360,458	$821,352	$2,181,810
Village of Corinth	5	$2,919,679	$1,764,546	$4,684,225
Village of Green Island	1	$1,193	$697	$1,890
Village of Hudson Falls	1	$0	$0	$0
Village of Menands	2	$31,623	$19,115	$50,738
Village of Schuylerville	17	$624,648	$369,073	$993,721
Village of South Glens Falls	3	$1,397,804	$844,941	$2,242,745
Village of Stillwater	138	$3,838,505	$2,241,352	$6,079,856
SUM	**728**	**$52,738,324**	**$31,668,264**	**$84,406,588**

2 Year Flood-Run of River Operation				
Municipality	**Number of Properties**	**Structural Damage**	**Content Damage**	**Total Damages**
City of Albany	83	$9,283,200	$3,761,134	$13,044,334
City of Cohoes	26	$337,972	$134,176	$472,148
City of Mechanicville	19	$517,872	$206,357	$724,229
City of Rensselaer	173	$1,391,113	$555,312	$1,946,425
City of Troy	156	$1,029,396	$468,270	$1,497,666
City of Watervliet	1	$20,882	$8,113	$28,995
Town of Bethlehem	26	$82,856,563	$21,250,010	$104,106,574
Town of Coeymans	22	$530,096	$194,065	$724,161
Town of Colonie	1	$39,742	$10,028	$49,771
Town of Corinth	22	$189,151	$71,501	$260,652
Town of East Greenbush	19	$1,716,000	$463,232	$2,179,232
Town of Easton	19	$8,021	$2,911	$10,932
Town of Fort Edward	3	$17,392	$5,118	$22,510
Town of Greenwich	8	$150,821	$58,509	$209,331
Town of Hadley	20	$409,056	$173,626	$582,682
Town of Halfmoon	5	$2,490,092	$634,468	$3,124,560
Town of Moreau	44	$366,643	$141,338	$507,981
Town of New Baltimore	9	$626,948	$183,156	$810,104
Town of North Greenbush	2	$24,341	$9,457	$33,798
Town of Northumberland	1	$0	$0	$0
Town of Queensbury	43	$711,488	$292,670	$1,004,159
Town of Saratoga	21	$405,512	$153,966	$559,478
Town of Schaghticoke	50	$487,071	$192,478	$679,548
Town of Schodack	48	$390,361	$129,964	$520,325
Town of Stillwater	22	$601,812	$231,792	$833,604
Town of Stuyvesant	4	$22,982	$13,415	$36,397
Town of Waterford	10	$856,579	$502,072	$1,358,651
Village o Castleton-on-Hudson	37	$3,411,273	$929,975	$4,341,248
Village of Corinth	13	$7,113,487	$1,845,096	$8,958,583
Village of Green Island	3	$30,640	$18,134	$48,774
Village of Hudson Falls	1	$0	$0	$0
Village of Menands	6	$6,143,329	$3,658,607	$9,801,937
Village of Schuylerville	17	$1,307,770	$369,073	$1,676,844
Village of South Glens Falls	4	$3,348,470	$844,941	$4,193,411
Village of Stillwater	138	$7,191,371	$2,241,352	$9,432,722
Village of Waterford	23	$122,351	$70,622	$192,973
SUM	**1099**	**$134,149,796**	**$39,824,941**	**$173,974,736**

10 Year Flood-Flow Regulation

Municipality	Number of Properties	Structural Damage	Content Damage	Total Damages
City of Albany	83	$6,245,468	$3,761,134	$10,006,602
City of Cohoes	26	$227,264	$134,176	$361,440
City of Mechanicville	19	$361,894	$206,357	$568,251
City of Rensselaer	173	$941,666	$555,312	$1,496,978
City of Troy	156	$796,662	$468,270	$1,264,932
City of Watervliet	1	$13,899	$8,113	$22,012
Town of Bethlehem	26	$35,179,424	$21,250,010	$56,429,435
Town of Coeymans	22	$329,098	$194,065	$523,163
Town of Colonie	1	$16,590	$10,028	$26,619
Town of Corinth	22	$124,485	$71,501	$195,986
Town of East Greenbush	19	$769,325	$463,232	$1,232,557
Town of Easton	19	$5,184	$2,911	$8,095
Town of Fort Edward	3	$8,769	$5,118	$13,887
Town of Greenwich	8	$100,557	$58,509	$159,066
Town of Hadley	20	$309,439	$173,626	$483,064
Town of Halfmoon	5	$1,050,952	$634,468	$1,685,420
Town of Moreau	41	$230,734	$130,267	$361,001
Town of New Baltimore	9	$309,868	$183,156	$493,024
Town of North Greenbush	2	$16,201	$9,457	$25,659
Town of Northumberland	1	$0	$0	$0
Town of Queensbury	35	$395,237	$224,349	$619,585
Town of Saratoga	21	$272,246	$153,966	$426,213
Town of Schaghticoke	50	$335,190	$192,478	$527,668
Town of Schodack	48	$221,552	$129,964	$351,516
Town of Stillwater	22	$404,380	$231,792	$636,172
Town of Stuyvesant	4	$22,982	$13,415	$36,397
Town of Waterford	10	$836,327	$502,072	$1,338,399
Village o Castleton-on-Hudson	37	$1,541,507	$929,975	$2,471,482
Village of Corinth	13	$3,053,386	$1,845,096	$4,898,482
Village of Green Island	3	$30,040	$18,134	$48,174
Village of Hudson Falls	1	$0	$0	$0
Village of Menands	6	$6,099,199	$3,658,607	$9,757,806
Village of Schuylerville	17	$624,648	$369,073	$993,721
Village of South Glens Falls	4	$1,397,804	$844,941	$2,242,745
Village of Stillwater	138	$3,838,505	$2,241,352	$6,079,856
Village of Waterford	23	$122,351	$70,622	$192,973
SUM	**1088**	**$66,232,832**	**$39,745,547**	**$105,978,379**

10 Year Flood-Run of River Operation				
Municipality	**Number of Properties**	**Structural Damage**	**Content Damage**	**Total Damages**
City of Albany	134	$20,690,539	$11,807,988	$32,498,527
City of Cohoes	36	$576,082	$329,890	$905,972
City of Mechanicville	36	$824,120	$468,775	$1,292,894
City of Rensselaer	293	$5,385,294	$3,181,691	$8,566,985
City of Troy	254	$1,940,783	$1,106,855	$3,047,638
City of Watervliet	2	$30,387	$17,852	$48,239
Town of Bethlehem	34	$84,153,116	$46,951,004	$131,104,121
Town of Coeymans	28	$682,837	$394,809	$1,077,646
Town of Colonie	3	$72,784	$40,967	$113,751
Town of Corinth	22	$190,966	$108,857	$299,822
Town of East Greenbush	21	$1,800,528	$1,005,478	$2,806,006
Town of Easton	30	$15,568	$8,693	$24,261
Town of Fort Edward	6	$24,350	$13,658	$38,008
Town of Greenwich	13	$220,569	$127,997	$348,566
Town of Hadley	20	$455,479	$251,219	$706,698
Town of Halfmoon	13	$2,618,544	$1,463,895	$4,082,439
Town of Moreau	43	$358,692	$199,484	$558,176
Town of New Baltimore	14	$718,865	$402,739	$1,121,604
Town of North Greenbush	3	$1,699,033	$1,026,655	$2,725,687
Town of Northumberland	3	$8,829	$5,154	$13,983
Town of Queensbury	43	$711,488	$400,066	$1,111,555
Town of Saratoga	23	$441,785	$247,105	$688,890
Town of Schaghticoke	64	$617,811	$354,430	$972,241
Town of Schodack	54	$429,576	$244,708	$674,284
Town of Stillwater	34	$853,230	$486,091	$1,339,321
Town of Stuyvesant	5	$48,934	$28,752	$77,686
Town of Waterford	23	$3,175,912	$1,829,296	$5,005,207
Village o Castleton-on-Hudson	52	$3,704,219	$2,070,371	$5,774,590
Village of Corinth	13	$7,288,306	$4,065,583	$11,353,889
Village of Green Island	6	$72,526	$40,544	$113,070
Village of Hudson Falls	1	$0	$0	$0
Village of Menands	12	$14,111,408	$7,966,963	$22,078,370
Village of Schuylerville	21	$1,356,134	$755,633	$2,111,767
Village of South Glens Falls	4	$3,348,470	$1,867,215	$5,215,685
Village of Stillwater	199	$8,365,064	$4,707,442	$13,072,506
Village of Waterford	60	$350,329	$202,424	$552,753
SUM	**1622**	**$167,342,555**	**$94,180,282**	**$261,522,836**

50 Year Flood-Flow Regulation				
Municipality	**Number of Properties**	**Structural Damage**	**Content Damage**	**Total Damages**
City of Albany	134	$12,382,456	$7,445,197	$19,827,653
City of Cohoes	36	$374,410	$220,119	$594,530
City of Mechanicville	36	$632,363	$363,319	$995,681
City of Rensselaer	293	$4,558,199	$2,732,085	$7,290,284
City of Troy	254	$1,234,102	$726,694	$1,960,796
City of Watervliet	2	$23,404	$13,662	$37,066
Town of Bethlehem	34	$35,487,355	$21,433,699	$56,921,054
Town of Coeymans	28	$433,135	$254,997	$688,131
Town of Colonie	3	$49,632	$28,834	$78,466
Town of Corinth	22	$124,488	$71,501	$195,989
Town of East Greenbush	21	$778,325	$468,591	$1,246,917
Town of Easton	30	$12,729	$7,215	$19,945
Town of Fort Edward	6	$15,727	$9,146	$24,873
Town of Greenwich	13	$171,705	$98,949	$270,654
Town of Hadley	20	$309,442	$173,626	$483,068
Town of Halfmoon	5	$1,050,953	$634,468	$1,685,421
Town of Moreau	43	$246,083	$138,824	$384,907
Town of New Baltimore	14	$388,170	$228,027	$616,197
Town of North Greenbush	3	$1,690,893	$1,021,771	$2,712,664
Town of Northumberland	3	$8,829	$5,154	$13,983
Town of Queensbury	43	$515,827	$292,670	$808,497
Town of Saratoga	23	$308,520	$174,734	$483,254
Town of Schaghticoke	63	$439,879	$252,078	$691,957
Town of Schodack	54	$252,465	$147,716	$400,181
Town of Stillwater	34	$655,799	$373,730	$1,029,529
Town of Stuyvesant	5	$37,388	$21,824	$59,212
Town of Waterford	23	$2,099,841	$1,263,782	$3,363,623
Village o Castleton-on-Hudson	52	$1,616,978	$974,386	$2,591,363
Village of Corinth	13	$3,053,387	$1,845,096	$4,898,483
Village of Green Island	6	$31,670	$19,088	$50,758
Village of Hudson Falls	1	$0	$0	$0
Village of Menands	12	$6,814,826	$4,091,188	$10,906,014
Village of Schuylerville	21	$673,010	$396,367	$1,069,377
Village of South Glens Falls	4	$1,397,804	$844,941	$2,242,745
Village of Stillwater	199	$5,012,202	$2,916,063	$7,928,265
Village of Waterford	60	$288,180	$166,552	$454,732
SUM	**1613**	**$83,170,177**	**$49,856,092**	**$133,026,270**

50 Year Flood-Run of River Operation

Municipality	Number of Properties	Structural Damage	Content Damage	Total Damages
City of Albany	209	$31,115,439	$17,449,526	$48,564,964
City of Cohoes	36	$681,442	$388,258	$1,069,699
City of Mechanicville	42	$1,030,322	$590,066	$1,620,388
City of Rensselaer	358	$12,448,587	$7,078,793	$19,527,380
City of Troy	262	$2,358,049	$1,333,293	$3,691,342
City of Watervliet	15	$160,486	$93,872	$254,358
Town of Bethlehem	39	$84,650,018	$47,222,183	$131,872,202
Town of Coeymans	28	$743,861	$430,384	$1,174,245
Town of Colonie	4	$772,170	$447,803	$1,219,973
Town of Corinth	54	$395,714	$226,891	$622,605
Town of East Greenbush	23	$1,821,566	$1,017,057	$2,838,622
Town of Easton	30	$19,439	$10,833	$30,272
Town of Fort Edward	6	$27,801	$15,680	$43,480
Town of Greenwich	13	$256,246	$147,838	$404,084
Town of Hadley	43	$802,523	$446,742	$1,249,265
Town of Halfmoon	13	$2,618,544	$1,463,895	$4,082,439
Town of Moreau	43	$367,970	$204,308	$572,279
Town of New Baltimore	17	$845,268	$475,949	$1,321,217
Town of North Greenbush	2	$4,011,762	$2,237,088	$6,248,850
Town of Northumberland	3	$13,265	$7,816	$21,081
Town of Queensbury	49	$886,704	$498,038	$1,384,742
Town of Saratoga	23	$459,462	$257,129	$716,591
Town of Schaghticoke	82	$801,017	$458,850	$1,259,866
Town of Schodack	60	$466,702	$266,209	$732,911
Town of Stillwater	34	$988,872	$558,087	$1,546,960
Town of Stuyvesant	6	$56,885	$33,493	$90,378
Town of Waterford	23	$4,877,395	$2,722,601	$7,599,996
Village o Castleton-on-Hudson	65	$3,817,575	$2,134,392	$5,951,967
Village of Corinth	31	$7,377,421	$4,117,311	$11,494,732
Village of Green Island	9	$78,490	$43,996	$122,486
Village of Hudson Falls	1	$0	$0	$0
Village of Menands	27	$16,641,431	$9,401,483	$26,042,914
Village of Schuylerville	21	$1,385,170	$770,771	$2,155,941
Village of South Glens Falls	4	$3,348,470	$1,867,215	$5,215,685
Village of Stillwater	199	$9,038,799	$5,081,330	$14,120,129
Village of Waterford	60	$434,323	$251,287	$685,610
SUM	**1934**	**$195,799,187**	**$109,750,467**	**$305,549,654**

100 Year Flood-Flow Regulation				
Municipality	**Number of Properties**	**Structural Damage**	**Content Damage**	**Total Damages**
City of Albany	209	$14,766,419	$8,875,287	$23,641,707
City of Cohoes	36	$374,410	$220,119	$594,530
City of Mechanicville	36	$632,363	$363,319	$995,681
City of Rensselaer	358	$6,896,703	$4,142,525	$11,039,228
City of Troy	262	$1,261,976	$742,303	$2,004,279
City of Watervliet	15	$148,728	$86,817	$235,545
Town of Bethlehem	39	$35,632,217	$21,518,259	$57,150,476
Town of Coeymans	28	$433,135	$254,997	$688,131
Town of Colonie	4	$726,036	$423,673	$1,149,709
Town of Corinth	22	$124,488	$71,501	$195,989
Town of East Greenbush	23	$790,329	$475,285	$1,265,614
Town of Easton	30	$12,729	$7,215	$19,945
Town of Fort Edward	6	$15,727	$9,146	$24,873
Town of Greenwich	13	$171,705	$98,949	$270,654
Town of Hadley	20	$309,442	$173,626	$483,068
Town of Halfmoon	13	$1,179,405	$708,800	$1,888,205
Town of Moreau	43	$246,083	$138,824	$384,907
Town of New Baltimore	17	$476,358	$279,506	$755,864
Town of North Greenbush	2	$1,674,692	$1,012,314	$2,687,006
Town of Northumberland	3	$8,829	$5,154	$13,983
Town of Queensbury	43	$515,827	$292,670	$808,497
Town of Saratoga	23	$308,520	$174,734	$483,254
Town of Schaghticoke	64	$450,652	$258,366	$709,018
Town of Schodack	60	$274,454	$160,552	$435,005
Town of Stillwater	34	$655,799	$373,730	$1,029,529
Town of Stuyvesant	6	$38,101	$22,223	$60,324
Town of Waterford	23	$2,099,841	$1,263,782	$3,363,623
Village o Castleton-on-Hudson	65	$1,670,914	$1,005,561	$2,676,475
Village of Corinth	13	$3,053,387	$1,845,096	$4,898,483
Village of Green Island	9	$36,239	$21,789	$58,028
Village of Hudson Falls	1	$0	$0	$0
Village of Menands	27	$8,346,177	$5,002,339	$13,348,516
Village of Schuylerville	21	$673,010	$396,367	$1,069,377
Village of South Glens Falls	4	$1,397,804	$844,941	$2,242,745
Village of Stillwater	199	$5,012,202	$2,916,063	$7,928,265
Village of Waterford	60	$288,180	$166,552	$454,732
SUM	**1831**	**$90,702,882**	**$54,352,383**	**$145,055,264**

100 Year Flood-Run of River Operation				
Municipality	**Number of Properties**	**Structural Damage**	**Content Damage**	**Total Damages**
City of Albany	320	$41,353,417	$23,354,543	$64,707,960
City of Cohoes	62	$1,634,095	$954,484	$2,588,579
City of Mechanicville	42	$1,030,322	$590,066	$1,620,388
City of Rensselaer	379	$16,516,762	$9,288,249	$25,805,011
City of Troy	549	$4,044,995	$2,334,384	$6,379,379
City of Watervliet	63	$892,733	$522,814	$1,415,547
Town of Bethlehem	39	$84,722,796	$47,265,850	$131,988,646
Town of Coeymans	28	$743,861	$430,384	$1,174,245
Town of Colonie	11	$1,315,219	$771,350	$2,086,569
Town of Corinth	54	$395,714	$226,891	$622,605
Town of East Greenbush	23	$1,827,175	$1,019,974	$2,847,149
Town of Easton	30	$19,439	$10,833	$30,272
Town of Fort Edward	16	$168,862	$96,765	$265,628
Town of Greenwich	16	$299,167	$171,772	$470,940
Town of Hadley	43	$802,523	$446,742	$1,249,265
Town of Halfmoon	13	$2,685,004	$1,502,400	$4,187,404
Town of Moreau	50	$399,406	$222,497	$621,902
Town of New Baltimore	17	$889,573	$502,532	$1,392,105
Town of North Greenbush	5	$4,040,975	$2,254,141	$6,295,116
Town of Northumberland	6	$33,010	$19,219	$52,229
Town of Queensbury	49	$886,704	$498,038	$1,384,742
Town of Saratoga	23	$459,462	$257,129	$716,591
Town of Schaghticoke	98	$900,354	$515,359	$1,415,713
Town of Schodack	60	$477,750	$272,837	$750,587
Town of Stillwater	34	$988,872	$558,087	$1,546,960
Town of Stuyvesant	6	$57,219	$33,666	$90,884
Town of Waterford	56	$5,127,597	$2,866,094	$7,993,691
Village o Castleton-on-Hudson	65	$3,849,062	$2,152,058	$6,001,120
Village of Corinth	31	$7,377,421	$4,117,311	$11,494,732
Village of Fort Edward	2	$20,796	$11,596	$32,392
Village of Green Island	159	$239,951	$137,910	$377,862
Village of Hudson Falls	1	$0	$0.0	$0
Village of Menands	31	$18,563,631	$10,410,620	$28,974,251
Village of Schuylerville	21	$1,385,170	$770,771	$2,155,941
Village of South Glens Falls	4	$3,348,470	$1,867,215	$5,215,685
Village of Stillwater	199	$9,038,799	$5,081,330	$14,120,129
Village of Waterford	166	$1,073,317	$618,277	$1,691,594
SUM	**2771**	**$217,609,623**	**$122,154,190**	**$339,763,813**

MALCOLM PIRNIE

ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

FINAL REPORT

STUDY OF IMPACTS OF HUDSON RIVER FLOW REGULATION

For
Hudson River – Black River
Regulating District

MAY 1984

MALCOLM PIRNIE

MALCOLM PIRNIE, INC.
ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

October 12, 1984

Hudson River-Black River
Regulating District
1 Columbia Place
Albany, New York 12207

ATTENTION: Mr. J. Lowell Fitzsimmons
Chairman

Gentlemen:

In accordance with the terms of our Contract dated January 9, 1984, we have completed the report on the Study of Impacts of Hudson River Flow Regulation. We herewith submit this document for your use.

The report identifies the users of the Hudson River which might be affected by a reduction in river flows during the summer months. An assessment has also been made of the probably economic impacts associated with the reduced summertime flows.

We appreciate the assistance and cooperation afforded us by the Hudson River-Black River Regulating District during the preparation of this report.

Very truly yours,

MALCOLM PIRNIE, INC.

Thomas C. Aulita, P.E.
Vice President

TJL:mhn

I. INTRODUCTION

The function of the Hudson River - Black River Regulating District is to operate its reservoirs "for the purpose of regulating the flow of streams, when required by the public welfare, including public health and safety." The Great Sacandaga Lake (formerly the Sacandaga Reservoir) is the District's only reservoir on the Hudson River Basin, and releases from this reservoir are controlled at the Conklingville Dam. Operation of the reservoir provides a reduction in flood flows and low flow augmentation in the Hudson River.

Approval of the construction plans for the Conklingville Dam in 1924 specified that the reservoir water level not be drawn below Elevation 756 between May 1 and Labor Day. The District's present operating policy is based upon balancing the needs of flood control, low flow augmentation, hydroelectric power generation and recreational interests. This policy has resulted in an average reservoir water surface at Elevation 758 for Labor Day since the dam's construction. However, the release of water to augment low flows is in conflict with recreational uses at the Great Sacandaga Lake, since periods of low flow and increased recreational usage both occur during the summer season.

Recreation users of the Great Sacandaga Lake have expressed their dissatisfaction with the District's operating policy to the point where legislation has been proposed which would mandate the minimum reservoir level at Elevation 762 between May 1 and September 30. Implementation of this policy would result in a reduction in Hudson River flows during the summer season.

The purpose of this report is to identify downstream users of the Hudson River which might be affected by a reduction in river flows during the summer months. Upon completion of the inventory, an assessment will be made of the probable economic impacts associated with reduced summertime flows.

II. INVENTORY

2.1 GENERAL

An inventory of entities making use of Hudson River flows which may be impacted by changes in flow regulation was developed from existing sources of information. These entities include:

- o Municipal and Industrial Wastewater Dischargers.
- o Municipal/Institutional Water Suppliers.
- o Industrial and Commercial Water Suppliers.
- o Hydroelectric Power Generators.
- o Thermal Power Generators.
- o Navigational Interests.
- o Recreational Interests.

A copy of the inventory data for each facility is contained in the Appendix to this report. The inventory data obtained for each major facility was mailed to the facility contact person, along with a letter describing the purpose of the study requesting that the data be reviewed for accuracy. Comments were also solicited. Tables summarizing the inventory data are included in this Section.

2.2 MUNICIPAL AND INDUSTRIAL WASTEWATER DISCHARGES

Current wastewater discharges into the Hudson River have been identified using SPDES (State Pollution Discharge Elimination System) Permit information. This information was obtained from the New York State Department of Environmental Conservation, Division of Pure Waters and consisted of computer printout of the SPDES master file dated July 5, 1983 for the Lower Hudson River Basin and January 16, 1984 for the Upper Hudson River Basin

These printouts were searched for all facilities which discharged to Hudson River.

A data sheet was generated for each facility with a wastewater discharge to the Hudson River. This data includes:

1. Location (mile point).
2. Name and address of facility and contact person.
3. Type of discharge (non-municipal discharges only).
4. Type and level of treatment.
5. Population served (municipal discharges only).
6. Discharge classification (non-municipal discharges only).
7. Toxic classification (non-municipal discharges only).
8. Discharge permit conditions.
9. Current volume and discharge loadings.
10. Remarks.

The SPDES master list contained information pertaining to Items 1, 2, 6, and 7. Mile points correspond to those indicated on U.S.G.S. maps were used by the NYSDEC for stream classification and its Hudson River mo Item 4 for municipal wastewater treatment plants was obtained from the NY publication, "Descriptive Data of Sewage Treatment Systems in New York Sta dated June 1983. Item 4 for industrial discharges was obtained thr discussions with NYSDEC personnel responsible for the industrial category pertained to the particular discharge. Data for Item 5 was obtained searching a recent NYSDEC computer printout entitled, "Sewage Treatment W - General Information Report".

To obtain information on Item 9, the NYSDEC's Daily Monitoring Rep (DMR) files were searched for recent operating data pertaining to facilities. Parameters of concern to this report are flow, BOD_5, temperatu toxics, and oil and grease. In general, the data for the last quarter of and the first three quarters of 1983 were available. The DMR files

indicated any updates to the SPDES computer printout. In many cases, the data was updated when the inventory data was reviewed by the facility.

2.2.1 Municipal Wastewater Treatment Plants

Appendix A contains the data sheets for the municipal discharges. Tables 2.1 and 2.2 present summary information of the data contained in the inventory sheets. As indicated in Tables 2.1 and 2.2, there are 33 municipal wastewater treatment plants with SPDES permits for discharge to the Hudson River. This total includes the partially completed plant at North River and the proposed plants at Fort Edward, Castleton-on-Hudson, and New Baltimore.

The municipal wastewater treatment plants included in the inventory range in size from 0.02 mgd to 170 mgd with the majority being between 0.1 and 5 mgd. Of the existing plants, 9 provide only primary wastewater treatment. At present, the secondary wastewater treatment plants are operating well within their average BOD_5 pounds per day discharge limits with the exception of the Stony Point Sewage Treatment Plant, which is approaching its design capacity and Rockland County Sewage Treatment Plant which is exceeding its design capacity. Plants that occasionally exceeded their maximum BOD_5 discharge limits include the Ossining Wastewater Treatment Plant, Newburgh Water Pollution Control Plant, Beacon Sewage Treatment Plant and Saratoga County Sewage Treatment Plant. These isolated violations were typically caused by unusual circumstances and are not expected to reoccur.

2.2.2 Industrial Wastewater Discharges

Appendix B contains the sheets for those industries which have a SPDES permit for discharges to the Hudson River. There are 65 facilities with wastewater discharges to the Hudson River.

Table 2.3 presents a summary of the discharges by discharge and toxic classification. A major (or significant) discharge is:

- A discharge, or combination of discharges under common ownership, of sufficient size and complexity to require substantial wastewater treatment.

- A discharge which, regardless of size, causes, or level treatment, could cause critical water quality problems and imp the best use of the receiving waters. Water quality problems cou include fishkills, bacterial contamination, odor, and discoloratio or long term impacts such as accumulation of toxic substances aquatic and benthic resources.

Volume of the determining discharge, organic and inorganic loadin toxicity, thermal content, and character and usage of receiving waters, all considered in the designation. A history of poor operati mismanagement, or non-cooperation may also be grounds for designatin particular discharger as major.

As indicated in Table 2.3, only 31 of the discharges are classified major (significant) discharges. Furthermore, only 24 of the discharges hav toxic classification. In general, the non-significant and non-to classifications correspond to facilities with SPDES permits for stormwa run-off. Table 2.4 presents a summary of the discharges classified as ma (significant) and/or toxic.

Facilities which had occasional monthly violations of their discha limits during the last year include:

- Kay Fries, Inc. (maximum BOD).
- Indian Point Station (maximum BOD).
- Roseton Generating Station (average and maximum Vanadium).
- IBM (maximum BOD).
- GE Silicone Products (maximum Xylene, Monochlorobenze Ethylbenzene, Methyl Chloride).
- Crown Zellerbach (average and maximum BOD).
- International Paper (average BOD).

2.3 MUNICIPAL/INSTITUTIONAL DRINKING WATER SUPPLIES

Information pertaining to water supplies using the Hudson River as a r water source was obtained from the NYSDOH computer printout, "Selected Publi Water System Inventory", dated 1/17/84. This printout included the Lower a Upper Hudson River Basins, and the specific Hudson River sources could b identified by the source name indicated on the printout.

A data sheet was generated for each facility which uses the Hudson Riv as a raw water supply source. This data included:

1. Location (mile point).
2. Name and address of facility and contact person.
3. Level and type of treatment provided.
4. Design capacity.
5. Current production, if metered.
6. Population served.

The "Selected Public Water Supply Inventory" contained informati pertaining to Items 1, 2, 3, and 4. The remaining information was obtain through discussions with NYSDOH personnel and survey/inventory data maintain by the NYSDOH.

Appendix C contains the inventory data for the public water supplies wi intakes on the Hudson River. Table 2.5 summarizes this data. There are intakes located on the Hudson River including the infiltration gallery at t Green Island Water Treatment Plant. It should be noted that Green Island present water supply source is a ground water source and is not direct connected to the Hudson River. Of the 9 water supplies, 7 are municipal wat supplies and 2 institutional water supplies.

The design capacity of the municipal water treatment plants range in si from 0.5 mgd to 15.2 mgd. All except Poughkeepsie have design capacities l than 3.5 mgd. New York City has an emergency water supply intake locat between Poughkeepsie and Beacon at Chelsea (Mile Point 66).

2.4 INDUSTRIAL AND COMMERCIAL WATER SUPPLIES

Inventory data for commercial and industrial facilities with water intakes on the Hudson River was not as readily available as information for facilities with wastewater discharges to the Hudson River. The U.S. Army Corps of Engineers (COE) maintains U.S.G.S. maps and corresponding permit information which indicate those facilities with COE permits for outfalls/intakes, docks, piers, etc. However, there are many facilities with intakes that do not have COE permits. Available information from the COE was obtained by searching the COE files.

Additional information pertaining to facilities with water intakes was obtained by searching the NYSDEC's SPDES permit application files. Many of the applications indicated the amount and source of water used at the facilities.

The NYSDEC, Division of Water, is developing procedures and methodologies for the development of a state-wide and sub-state water resource management strategy. A pilot study, entitled, Capital Region Water Resources Strategy, was the first step in this program. Part of this study included an industrial use survey in the form of a questionnaire which was sent to industries in Albany, Columbia, Greene, Rensselaer, Saratoga and Schenectady counties. The response to the questionnaire was about 30 percent. These completed questionnaires searched for industries with intakes on the Hudson River.

During the late 1950's and early 1960's, the NYSDOH undertook surveys of the Hudson River Drainage Basin to establish water quality standards recommended for assignment to waters of the drainage basin. Part of these surveys included a survey of municipal, industrial, and institutional surface water supplies. This information was also reviewed during development of the inventory.

A final source of information utilized was the planning agencies of the various counties located along the Hudson River. These agencies were contacted to identify major industries located on the Hudson River.

assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the body of water." There are also several general and special criteria that govern thermal discharges. These include:

1. The water temperature at the surface of a stream shall not be raised to more than 90° F at any point.

2. At least 50 percent of the cross sectional area and/or volume of flow of the estuary including a minimum of one third of the surface as measured from shore to shore at any stage of tide shall not be raised to more than 4°F over the temperature that existed before the addition of heat of artificial origin or to a maximum of 83°F whichever is less.

3. From July through September, if the water temperature at the surface of an estuary before the addition of heat of artificial origin is more than 83°F an increase in temperature not to exceed 1.5°F at any point of the estuarine passageway as delineated above, may be permitted.

The regulations contain provisions for modification of the criteria if the discharger can prove that the criteria are unnecessarily restrictive and that a modification to the criteria would assure the protection and propagation of a balanced population of aquatic life. The NYSDEC reports that the thermal plants along the Hudson are currently meeting the thermal standards and either complying with the criteria or have been granted a modification.

3.4.5 Recreation

Swimming and recreational boating are two uses that have similar water quality requirements. Water quality for swimming should satisfy three general conditions. First, the water should be esthetically pleasing and free from obnoxious floating or suspended solids, heavy growths of attached plants or animals, algae blooms, objectionable color and foul odors. Second, the water should be reasonably free from pathogenic organisms. Finally, the water should contain no substances that are toxic upon ingestion or that are irritating to the skin. In general, only the first condition listed for swimming would be a condition of recreational boating.

Ease of access is another important consideration for swimming and boating. Since the hydrostations and other impoundments on the Upper Hudson River are essentially run of river facilities, a relatively stable water level is maintained. However, the water elevations of the pools may fluctuate up to 3 feet on a diurnal basis depending upon the discharges of the Sacandaga Reservoir, natural flow of the Hudson River above Hadley, and the power requirements of the individual dams. The reduction in flows is not expected to affect the water levels in the Lower Hudson where tidal action occurs.

In addition to the above sources, information was obtained through dir contact with the facility. Appendix D contains the inventory for t industrial/commercial water supplies. This information is summarized in Tab 2.6. It should be noted that the intakes for the thermal power generati facilities are included in Section 2.6.

2.5 HYDROELECTRIC POWER GENERATION

Inventory data for the hydroelectric power generation facilities locat on the Hudson River and on the Sacandaga River between the Conklingville D and the Hudson River was obtained from three main sources. The first was t Hudson River Basin, Level B, Water and Related Land Resources Study prepar by the NYSDEC (February 1979). The second source was a report prepared Tippetts-Abbett-McCarthy-Stratton for Niagara Mohawk Power Corporati entitled, Hydroelectric Studies of the Upper Hudson River (December 1980 The final source was the NYSDEC Division of Fish and Wildlife Status Report Hydropower Projects (December 1983).

Inventory data for the hydroelectric facilities included the locati (mile point) and the name, address, and owner of the facility. Appendix contains the data sheets for each facility. This information is summarized Table 2.7. It should be noted that the facility at Baker Falls is not service. Fort Miller Pulp and Paper Company is presently developing t hydroelectric potential created by the Fort Miller Dam (Mile Point 186 Several additional projects are proposed and in various stages of licensi for developing the hydroelectric potential created by the existing Hudso River impoundments.

2.6 THERMAL POWER GENERATION

Information pertaining to the power generating facilities, other tha hydroelectric, was obtained predominantly from the same sources as that fo the industrial wastewater discharges. Additional information was obtained

from the staff of the New York Power Pool and the 1983 New York Power Pool Report (Section 5-112). Appendix F contains the inventory sheets for the thermal discharges. This information is summarized in Table 2.8. There are 3 fossil fuel, 1 nuclear and 1 resource recovery power generating facilities located on the Hudson River. All of these facilities are located on the lower Hudson River. Furthermore, the thermal power facilities are located south of Newburgh, with the exception of the Albany Steam Station. Violations of the maximum discharge temperature have occurred at the 59th Street Generation Station, Lovett Generating Station, Roseton Generating Station, and Danskammer Point Generating Station.

2.7 NAVIGATION

2.7.1 Volume of Traffic on Hudson River and Champlain Canal

The Federal Channel in the Hudson River is 32 feet deep between New York Harbor and Albany, and then is sharply reduced to a 14 foot depth between Albany and Waterford. The controlling depth is further reduced north of Waterford where the depth of the Champlain Canal is 12 feet.

As shown in Table 2.9, the majority of commercial traffic in the Champlain Canal travels north. In 1981, the total originating tonnage in the Champlain Canal was 544,186. Essentially all of the tonnage on the Champlain Canal was comprised of petroleum products(1).

In addition to the tonnage on the Champlain Canal, a large volume of traffic occurs on the Hudson River between New York Harbor and Waterford. Although the tonnage appears to be declining over the years as shown in Table 2.10, 17,739,985 tons of ocean going as well as internal traffic traversed the Hudson River in 1981(2). The range of commodities shipped is extensive as indicated in Table 2.11.

2.7.2 Sediment Transport and Maintenance Dredging

Most of the maintenance dredging consists of removing sediments that have been carried into the Hudson River by its tributaries during periods of heavy

runoff. In addition, minor amounts of sediments erode from the banks of the river.

Over the next ten years, maintenance dredging requirements for the Hudson River south of the Troy Lock and Dam are estimated at 950,000 to 1,300,000 cubic yards[3]. Upstream of the Troy Dam an estimated 170,000 cubic yards would be dredged[4].

The amount of sedimentation is dependent on stream velocity and particle size. Sediment deposits are usually located at the shallows and backwaters of the river and where the width of the river is enlarged. These areas act as temporary sediment traps that can be expected to scour during high flow conditions. During floods, the sediment in the estuary above Beacon is scoured by higher river velocities, and carried downstream until the channel widens and the velocity is sufficiently reduced so that the sediment settles out.

The impacts of dredging vary with a multitude of factors. Among these are types of dredging, dredging rate, depth, current and type of sediment. An estimate of the total amount of resuspension is approximately 2% of the material dredged by a hydraulic dredge and 4% for a clamshell.

As a result of dredging, plumes of varying size and duration are created. The finer grained sediments, in general, have a slower settling velocity, thereby resulting in a larger plume for an extended period of time. Based on flag test results compiled by NYS DOT in 1982 (Champlain Canal) and particle size distributions presented in Hudson River Federal Channel Maintenance Dredging, Vol. 2 (Albany to Kingston) it appears that particle size distribution fluctuates along the canal and river. Studies conducted on previous dredging operations in the Hudson River show undetectable increases in PCB and other contaminant levels more than one mile downstream from dredging operations.

2.7.3 Glens Falls Feeder Canal

The Glens Falls Feeder Canal supplies water to the Champlain Canal over the navigation season which extends from April through December. Water is diverted from the Hudson River west of Glens Falls and augments lockage water at the summit level of the Champlain Canal. The diverted water flows north and south as lockages are made and allows for maintenance of required navigation levels. About 25 percent of the diverted water returns to the Hudson River. The remainder ultimately flows into Lake Champlain.

Diversions from the Glens Falls Feeder Canal are limited by law to a monthly average of 150 cfs. The actual average amount of diversion is about 100 cfs.

2.8 RECREATION

2.8.1 Water Contact Recreation

The New York State Office of Parks and Recreation maintains an inventory, by county, of outdoor recreation facilities. The New York State Recreation Facilities Inventory contains information on the name, address (in some cases) and type of activity. Table 2.12 lists those facilities on the Hudson River between the Sacandaga River and Troy Lock and which have water recreation such as swimming and boating. It should be noted that the Hadley Beach is located at the confluence of the Sacandaga and Hudson Rivers.

There are three recreational areas on the Sacandaga River between the Conklingville Dam and the Hudson River in the Town of Hadley. The Mohawk Beach and Picnic Area and Stewart's Pond Campground have developed swimming beaches while the Stewart's Bridge Hydroelectric Facility and Stewart's Pond Campground have boat launch ramps.

In addition to the facilities listed in Table 2.12, there are 115 boat marinas/launch ramps, 14 fishing areas, and 5 swimming areas on the Hudson

River between the Troy Lock and Dam and New York City. The swimming area located at:

- Town of Marlboro Recreation Park, Milton, New York.
- Kingston Point, Kingston, New York.
- Saugerties Municipal Park, Saugerties, new York.
- Croton Point County Park, Croton, New York.
- Kingsland Point Park, North Tarrytown, New York.

2.8.2 Hudson River Fishery Resource

Historically, the Hudson River supported a viable commercial fish Commercial finfishing peaked between 1900 and 1940 but is, most recently the decline. Reported catches for certain species are shown in Table .13 These numbers likely represent a significant undercount because they probably based on reported incomes. The most important species fi commercially are striped bass, shad, alewife, blueback herring and Atla sturgeon. Of these, the striped bass is the dominant sportfish.

Due to the high sediment PCB levels in several areas of the Hudson Riv water quality and consequently fisheries have been affected. Commercial recreational fishing is prohibited between Fort Edward and the Troy dam. the lower Hudson, the commercial sale of all fish is prohibited exc American shad, Atlantic sturgeon greater than four feet in length and goldfi used for ornamental purposes.

A popular sports fishery for walleye, smallmouth bass, largemouth ba chain pickerel, northern pike, yellow perch, bullheads, carp, and panfi exists on the Hudson River between the Sacandaga River and Glens Falls However, no quantified estimates of this recreational fishery are available.

There is no significant recreational fishery between Glens Falls and t Troy Dam. Juvenile fish can still be found in this area but there is distinct absence of the mature segment of the fish population. In additio the Hudson River is currently closed to recreational fishing in this area.

the 4 mg/l standard. The Lower Hudson River above Mile Point 127 is classified as water quality limiting which means the stream standards cannot be met with the BPT of wastewater discharges. Below Mile Point 127, the Lower Hudson is classified as effluent limiting which means the stream standards can be met with BPT.

Under present operating procedure, the MA7CD/10 flow is dependent upon summer holiday weekends when the reservoir may not release flow for two days. During other summer weekends, use of the MA7CD/10 flow and even other less severe minimum weekly flows may underestimate the daily water quality impacts of wastewater discharges in the Upper Hudson. This is somewhat accounted for by the way the NYSDEC Hudson River model simulates the DO levels in the river. That is, when three critical events - MA7CD/10 flow, all discharges at design rate, and minimum ambient DO concentration - occur simultaneously.

Water Quality Data - Recent USGS water resources data was reviewed to determine if a correlation existed between Hudson River flows and naturally occurring water quality parameters during periods of low flows. Data for Corinth indicated no correlation between dissolved solids and flow for flows typically occurring between May 1 and September 30. A similar statement can be made based on corresponding data for Waterford. Suspended solids data (filterable solids residue at 105^{0} C) for Fort Edward, Stillwater, and Waterford indicates a suspended solids concentration independent of flow and varying between 0 and 15 mg/l for flows between 1000 cfs and 4000 cfs. The average suspended solids concentration during the summer period was about 6 mg/l.

With the exception of PCB's, sufficient data is not available on the relationship between the concentrations of man-made pollutants, such as toxic substances, and river flow. During October 1976 to September 1978, extensive analyses were performed for 14 organic pesticides in the Hudson River water at Waterford. None were detected. The instantaneous river flow during sampling ranged between 680 cfs and 70,500 cfs.

Any toxic substances introduced to the river at municipal and industrial wastewater treatment plants and from non-point sources are diluted by river

flows. Therefore, the concentrations of these toxic substances in the river would be higher during low flows given a constant discharge from a point or non-point source.

As discussed in Chapter 2, PCB's are desorbed from river bottom sediments during periods of low flow. Recent USGS water resources data at Waterford indicates that the PCB concentration in the water column is independent of flow and varies between less than 0.1 ug/l and 0.5 ug/l for flows ranging between 1000 cfs and 4000 cfs. Two factors may account for this relationship. First, in the low flow range, desorbtion transfer occurs at a relatively constant rate. Therefore, at lower flows, lower dilution takes place and the dissolved PCB concentration is higher. On the other hand, the total sediment load from scouring of bottom sediments decreases as flow decreases. Therefore, at lower flows, there would be less sediment-borne PCB in the river water.

Salt Front - Chlorides concentration is directly related to the location of the salt front which is arbitrarily defined as the location where the chloride concentration is 50 mg/l. The extent to which the saline water travels upstream depends predominantly upon the river flow and the ocean tides. If the Lower Hudson River flow could be stopped at its tributaries and the Troy Dam, ocean water would move upstream to the dam. During periods of low flow in the late summer and early fall, the salt front may move 60 to 70 miles upstream of the Battery to the Chelsea vicinity and, on occasion, above Poughkeepsie. During high spring discharges, the salt front moves downstream to a point between Yonkers and Tappan Zee. During the typical year, the salt front fluctuates between mile point 20 and 60. A record high of 342 ppm of chlorides was reached at the Poughkeepsie Water Works (Mile Point 76) on November 20, 1964. Very low average flows during the preceding months and a sustained southwest wind caused this unusual event.

A recent study[1] evaluated New York City's continued use of the Chelsea Pump Station (Mile Point 66) as an emergency raw water supply. A review of

[1] Malcolm Pirnie, Inc. Proposed Reactivation of the Hudson River Pumping Station Located at Chelsea, New York - Stage 1 Draft Environmental Impact Statement, prepared for the City of New York Department of Environmental Protection, March 1984.

existing water quality data indicated that the concentrations of the various physical, inorganic, and organic constituents of the Hudson River water at Chelsea were below the Federal and State maximum contaminant levels and recommended guidelines in nearly all cases. The exceptions were iron, manganese, color, turbidity and chlorides, all of which are aesthetic rather than health related concerns. The Hudson River water was found to be comparable to the raw water supplies of other major population centers within and outside the drainage basin. No raw water quality parameters in the Hudson River were significantly higher than those found in the sources of other water supplies. In addition, water from the Hudson River would be diluted with water from the city's reservoirs prior to consumption.

3.3 REREGULATED FLOWS AND WATER QUALITY

3.3.1 Flows

Upper Hudson River - The proposed modifications to the current operation of the Conklingville Dam would set a minimum water surface elevation of 762 feet (MSL) between May 1st and September 30th. This would permit a drawdown of only 6 feet from the late spring maximum level. This amounts to approximately a 50 percent reduction in the storage available for discharge under the current operation with a 12 foot drawdown over the same period. This would limit flexibility in regulating the lake and amplify the effect of any operational errors. In particular, a failure to fill the reservoir at the beginning of the summer season could result in extreme low flows at Spier Falls during the dry summer months which, in turn, would effect the river's ability to assimilate wastewaters and adversely impact fish and wildlife, recreation, water supply, and other beneficial uses of the Hudson.

To properly assess the impacts of the low flows resulting from a 6 foot drawdown constraint, it is necessary to estimate a low flow analogous to the MA7CD/10 flow. The MA7CD/10 flow is the minimum average flow for seven consecutive days for a ten year recurrence interval. This figure is statistically derived based on historical flow data. Since no historical operating data for a 6 foot drawdown is available, existing data on lake

inflows and upstream Hudson River flows have been used to determine the effects of a 6 foot drawdown on flows at Spier Falls. To accomplish this, a computer program was developed. The input data consisted of the flow entering the reservoir, the Hudson River flow at Hadley above the confluence with the Sacandaga, a target flow to be obtained at Spier Falls, and the volume of storage within the reservoir for increments of reservoir depth. The computer compared the flow in the Hudson at Hadley to the target flow at Spier Falls and if this flow was less than the target amount, determined the volume of water to be released from the reservoir to reach the targeted flow. The revised elevation of the water surface in the reservoir resulting from the release was then calculated on the assumption that the reservoir was full (Elevation 768) at the beginning of the season.

If the flow in the Upper Hudson exceeded the targeted amount, the flow entering the reservoir was assumed to be stored and a new, higher water surface elevation was determined. If under this condition, the reservoir water surface reached Elevation 768, sufficient water was assumed to be released to maintain that elevation, and a flow in excess of the targeted amount at Spier Falls resulted.

Historic data on average weekly flow rates between early spring and late fall for the period from 1964 to 1982 were used to simulate the summertime reservoir drawdown at varying target flows for each year. By varying the target flow at Spier Falls and observing the effects on the reservoir water surface, it was possible to select that target flow which just resulted in a 6 foot drawdown in a given year. This target flow represented the highest sustained flow which could have been achieved at Spier Falls during that particular year. The information used in the computer model is included in Appendix I.

A statistical analysis of the target flows which would produce a 6 foot drawdown each year was made to evaluate the range over which those target flows might be expected to vary. This analysis indicated that, in 50 percent of the 19 years considered, the target flow would equal or exceed 2,200 cfs at Spier Falls, while in 90 percent of the years, the target flow would equal or

exceed 1,700 cfs. That is, in one year out of ten, the highest sustained flow possible at Spier Falls would be 1,700 cfs.

As noted above, the highest sustained flow which could have been achieved at Spier Falls in any particular year is based upon the historic data for that year. Of course, in actual operation of the reservoir, the flows which will enter the reservoir and those from the Upper Hudson during the ensuing weeks and months are not known in advance. Assumption as to the probable future flows must be made when determining the rate at which water can be released without exceeding the drawdown constraint. Thus, in actual operation it is highly unlikely that a target flow could be established at the beginning of the summer season which would result in exactly 6 feet of drawdown by September 30th. In practice, a new target flow would probably be established each week based on the reservoir level at the end of the preceding week and weather forecasts for the coming days. This will result in a varying flow rate in the Hudson at Spier Falls which must, at some times, be less than the maximum sustained flow which might be met if the future could be predicted with accuracy.

An estimate of how much difference there might be between the theoretical maximum flow that could be maintained at Spier Falls if the future could be predicted accurately and the flow that is likely to result under actual operating conditions must be made to arrive at an estimate of the MA7CD10 flow under the 6 foot drawdown constraint. In order to make this estimate, the reservoir operating records for the past 20 years were reviewed. During this time period, the Regulating District has attempted to limit drawdown of the reservoir to about 10 feet through Labor Day while at the same time, release as much water as possible to provide for low flow augmentation. A comparison of actual flows to the maximum theoretical flow that could have been sustained at Spier Falls under this operating procedure indicates that the lowest seven consecutive day flow each year was usually about 450 cfs less than the theoretical maximum flow for that year. However, in all but 3 of the years evaluated the seven day low flow occurred over a holiday weekend when no releases were made from the reservoir for 2 days out of 7. If seven day periods containing both a Sunday and a holiday are excluded, the seven day low

flow each year was generally about 200 cfs less than the theoretical maximum flow that could have been achieved.

In estimating the MA7CD/10 flow which might result under a 6 foot drawdown constraint, it has been assumed that the Regulating District would adopt a policy of maintaining as high an average seven consecutive day low flow as is possible to minimize impacts on downstream water quality, i.e., if no releases are to be made on two days out of seven during a holiday week, increased releases would be made on days preceding and following the holiday weekend to maintain the average seven consecutive day low flow at a higher level. It is further assumed that the minimum average seven consecutive day low flow which occurs during a given year will be approximately 200 cfs less than the theoretical highest sustained flow possible for that year. Under these assumptions, the MA7CD/10 low flow at Spier Falls is estimated at 1,500 cfs under a 6 foot drawdown constraint. This is 260 cfs less than the current MA7CD/10 flow used by NYSDEC in establishing wastewater discharge permit limitations in the Upper Hudson River immediately below Spier Falls. This 260 cfs reduction in the MA7CD/10 flow will affect all reaches of the Upper and Lower Hudson. Table 3.2 shows existing and estimated reregulated MA7CD/10 flows for the river.

Lower Hudson River - The 260 cfs reduction in the MA7CD/10 flow in the Upper Hudson results in a reregulated MA7CD/10 flow of 2,740 cfs for the Lower Hudson. The reregulated average freshwater summer flow over the Troy Dam is estimated at 3,500 cfs. This will increase as the river travels downstream because of tributaries entering the Lower Hudson.

3.3.2 Water Quality

Dissolved Oxygen - At the request of the Hudson River Black River Regulating District, the NYSDEC has run the Hudson River model on the basis of the reduced MA7CD/10 flow and the SPDES permit BOD loadings at the wastewater treatment plants. The results under the existing MA7CD/10 and reduced flow scheme are shown in Table 3.3. As indicated by these results, the DO

concentration will fall below the minimum requirements of Reach 12, between the Waterford Dam and the Troy Dam.

As indicated in Table 3.3, the minimum DO that occurs under the reregulated MA7CD/10 is 3.7 mg/l as compared to the minimum required DO of 4.0 mg/l that occurs under the existing MA7CD/10. In general, the DO concentrations under the reregulated MA7CD/10 are 3 percent lower upstream of the former Fort Edward Dam site and 10 percent lower downstream of that location. It should be noted that the permitted BOD loadings are significantly greater than the actual loadings in most cases.

For the Lower Hudson River, the impact of the reduced MA7CD/10 flow on DO levels was derived through proportion since the Lower Hudson Model is not currently in a usable form. A 15 percent reduction in low flows in the Upper Hudson resulted in a 10 percent reduction in DO. Therefore, for the Lower Hudson, the 9 percent reduction in low flow is estimated to reduce the DO concentration by 6 percent. Table 3.4 shows the approximate DO concentrations at the existing and reregulated MA7CD/10 flow for the impacted section of the Lower Hudson. The reduction in flows should not significantly affect the DO concentrations downstream of Mile Point 120.

It should be noted that the DO concentration in the Lower Hudson is dependent on the DO and BOD passing the Troy Dam. If water quality were improved upstream of the dam to prevent the predicted violation of the DO standard under the reregulated flow, then the resulting DO levels in the Lower Hudson (Capital District Pool) would be somewhat higher than that indicated in Table 3.4.

Recent survey data has indicated that the DO levels in the Capital District Pool have been improving and that the model may need updating. In addition to the installation of the Albany and Rensselaer County Wastewater Treatment Plants, a few of the combined sewer overflows in the Capital area have been eliminated. While the overflows are not directly included in the model, they act as sinks or consumers of dissolved oxygen in terms of the model parameters of benthic uptake and deoxygenation rate.

Salt Front - Based on information presented in preceding sections, reduction in low flows is not expected to cause an increase in the concentration of naturally occurring river water constituents with the exception of chlorides associated with the salt front movement.

A relationship between the salt front location and the Hudson River flow at Troy, based on samples collected in 1958, 1959, 1965 and 1966, was developed by the Research and Development Department of the former Board of Water Supply of the City of New York. This relationship indicates that the salt front is located at Mile Point 66.5 for the existing average summer flow. A reduction in summer flows of 600 cfs could cause a 1.5 mile upstream movement of the salt front to Mile Point 68. If the Chelsea Pumping Station (Mile Point 66) were operating, the salt front could move upstream to Mile Point 69. The salt front is located at Mile Point 72 for the existing MA7CD/10 flow over the Troy Dam. The 260 cfs reduction in the MA7CD/10 would cause the salt front to move about 2 miles upstream to Mile Point 74.

The position of the salt front at the start of the summer dry season is dependent upon spring run-off. Unusual high tides and winds and stream flow from tributaries to the lower Hudson River all affect the correlation between the actual location of the salt front and that predicted by the curve developed by the Board of Water Supply. Curves have also been developed that represent the approximate distributions of chloride concentrations along the Hudson River under average and normal conditions and for a similar stage of tide. Detailed statistical evaluations are required to determine the probability of occurrence of any particular unusual occurrence.

Other Parameters - As a conservative estimate, a reduction in low flow would increase the concentration of man-made pollutants in direct proportion with the decrease in flow. Upstream of the Troy Dam, the MA7CD/10 flow would be decreased by about 15 percent. The MA7CD/10 flow would be decreased by about 9 percent downstream of the dam. Average flows during the summer months would decrease by about 20 percent and 11 percent on the Upper and Lower Hudson River, respectively. Surface water temperatures rise and fall in response to daily changes in air temperature and are not expected to be affected by the reduction in low flows.

3.4 WATER QUALITY REQUIREMENTS

3.4.1 Municipal/Industrial Wastewater Treatment Plants

The impacts of discharges from wastewater treatment plants are predominantly governed by the NYSDEC's Classification and Standards of Quality and Purity. Quality standards have been established for all segments of the Hudson River on the basis of the best usage of the waters. Standards potentially affected by a reduction in low flow are those for 1) dissolved oxygen, and 2) taste and odor-producing substances, toxic wastes and deleterious substances, and 3) phenolic compounds.

The stream classifications and dissolved oxygen requirements were shown previously in Table 3.1. The standards for toxic and deleterious substances generally specify none in amounts that will be injurious to fishlife or which in any manner, shall adversely affect the flavor, color, or odor thereof, or impair the waters for any best usage as determined for the specific waters. In addition, Class A, B, C and D waters have established limits for ammonia or ammonia compounds (2.0 mg/l), cyanide (0.1 mg/l), ferro or ferric cyanide (0.4 mg/l), copper (0.2 mg/l), zinc (0.3 mg/l), and cadmium (0.3 mg/l). In Class A waters, phenolic compounds should not exceed 0.005 mg/l.

3.4.2 Drinking Water Supplies

Drinking water supplies are judged on physical, chemical, bacterial, and radiological quality. In evaluating the impact of a decreased river flow on a water supply, consideration must be given to 1) the quality of the water found in the Hudson River and 2) the quality of the treated water. While most of the physical and bacterial constituents of the Hudson River can be altered or removed by conventional water treatment, there may be chemical substances in the Hudson River that are not affected by treatment.

Quality of the finished or drinking water is governed by the EPA's National Primary Drinking Water Regulations and the New York State Sanitary Code , Part 5, Drinking Water Supplies. These regulations establish maximum contaminant levels (MCLs) for inorganic chemicals, organic chemicals, turbidity, microbiological contamination and radionuclides. The MCLs for those substances presently regulated are presented in Table 3.5. The USEPA is

considering MCLs for 13 additional inorganic contaminants, more than 10 additional organic contaminants and several additional radionuclides. The NYSDOH Recommended Maximum Drinking Water Levels for Eleven Classes of Organic Chemicals (1980) and the NYSDEC Organic Chemical Drinking Water Guidelines also contain recommended criteria for drinking water supply. Of particular importance to this study is the state guideline of 1 ug/l for PCB's

Quality of the raw water supply is governed by the New York State Sanitary Code, Part 170, Sources of Water Supply, and the EPA's Recommended Criteria for Raw Water Quality for Public Drinking Water Supplies. These guidelines specify maximum allowable limits for physical, microbiological, inorganic and organic chemical, and radioactive constituents or characteristics of a raw water supply. In general these limits are the same as those acceptable for finished water. The major difference is a higher allowable maximum limit for turbidity (5 TU) and coliform bacteria (20,000 per 100 ml). In addition, the guidelines contain maximum concentration limits for several organic pesticides.

3.4.3 Industrial Water Supplies

The quality of water required for industrial use varies depending on the use of the water and the type of treatment it receives prior to use. Since many industries use large volumes of water, treatment is provided at the lowest practical level that would not adversely affect the industry's product or equipment. Effects on products include decay resulting from biological action, staining, corrosion and chemical reaction and contamination. Effects on equipment include both deterioration of equipment and reduction of efficiency or capacity caused by corrosion, scale deposition, tuberculation, organic growths and foaming.

The predominant water use of the industries along the Hudson River is cooling water. Other major uses include pulp and paper manufacturing, chemical products manufacturing, and cement production.

Hardness, suspended solids, dissolved gases, acids, oils and other organic compounds and slime forming organisms are the major constituents of a water supply that can lead to corrosion, scaling and organism growth in cooling equipment. Water of almost any quality can be used for cooling purposes, including sea water, treated sewage, and polluted river water. In general, the limiting concentrations for a cooling water supply are:

o	Turbidity	50 mg/l
o	Hardness	50 mg/l
o	Iron	0.5 mg/l
o	Manganese	0.5 mg/l
o	Iron and Manganese	0.5 mg/l

In most cases, the initial temperature of the water is of considerable importance to cooling water supplies.

Water uses for pulp and paper manufacturing include process water for digestion of woodchips, washing of pulp and papermaking, cooling and boiler feed. Suspended matter, hardness, turbidity, color, dissolved gases, iron, manganese, silica and organic matter are the predominant undesirable constituents of process waters for pulp and paper manufacturing. Table [illegible] provides the maximum recommended chemical constituents of process waters used for pulp and paper manufacturing. In general, the Upper Hudson River water quality is within these limiting concentrations during periods of low flow.

Water quality requirements for chemical production vary widely and are dependent upon the product being manufactured. In general, the chemical process industries using Hudson River water provide screening prior to use.

3.4.4 Thermal Power Plants

Thermal discharges are governed by the Part 704, Criteria Governing Thermal Discharges, of the Environmental Conservation Code. The water quality standard states that "all thermal discharges to waters of the State shall

At some future date, it must be anticipated that the full reduction permitted BOD discharges of 7,300 pounds per day in the Glens Falls-Bakers Falls area and 2,200 pounds per day in the Capital District Pool will have be achieved by increased BOD removal at treatment plants.

The present day cost of constructing, operating, and maintaining tertiary treatment facilities to accomplish this provides an approximation of the upper range of values associated with the loss of BOD assimilative capacity in the river. In estimating these costs it has been assumed that the required BOD reduction could be achieved by adding tertiary treatment at one major treatment plant in the Glens Falls-Bakers Falls area and one plant discharging to the Capital District Pool.

On the basis of cost curves developed for wastewater treatment unit processes by the USEPA it is estimated that tertiary coagulation/sedimentation facilities for the removal of an average of 7,300 pounds per day of BOD from discharges to the river in the Glens Falls-Bakers Falls area would have a construction cost of $7,200,000 to $8,800,000 and operation and maintenance costs between $1,800,000 and $2,200,000 per year. Similarly, the construction cost for tertiary filtration facilities required to remove an average of 2,200 pounds per day of BOD from discharges to the Capital District Pool would be between $11,400,000 and $12,600,000 while operation and maintenance costs would be between $1,900,000 and $2,100,000 per year. The equivalent annual cost of these facilities would be between $2,800,000 and $3,400,000 per year in the Upper Hudson and between $3,400,000 and $3,800,000 in the Capital District Pool.

In summary, the estimated value of the reduced BOD assimilative capacity of the river related to a reduction in the MA7CD/10 flow ranges from $4,500,000 to $5,200,000 per year under current discharge conditions to a high of $7,200,000 per year under future conditions when the full assimilative capacity might be utilized.

The NYSDEC's proposed new permit limits for toxic substance discharges will require removal of from 75.6 percent of existing chromium discharges to

IV. IDENTIFICATION OF IMPACTS

4.1 GENERAL

Impacts, both adverse and beneficial, would result from the reregulation of Hudson River flows. Potential beneficial impacts associated with increased recreational usage of the reservoir are being documented by others in an on-going report to the Hudson River-Black River Regulating District. Impacts on hydroelectric facilities have been studied previously and are not included in this report. While an evaluation of the potential impacts on the Regulating District's flood control function is beyond the scope of this report, mention has been made herein of the probable effects of a reduced drawdown on flooding.

This chapter will address the impacts on "users" of Hudson River flows downstream of the Sacandaga Reservoir. These users include:

- o Wastewater Dischargers.
- o Water Supplies.
- o Thermal Power Plants.
- o Recreation Interests.
- o Navigation Interests.

4.2 IMPACTS ON WASTEWATER TREATMENT PLANTS

4.2.1 BOD Loadings

Upper Hudson - The results from the NYSDEC's Hudson River Dissolved Oxygen (DO) model, included as Appendix J, indicate that at the reduced MA7CD/10 flow the DO levels will fall below the 4.0 mg/l standard just above the Troy Dam.

According to NYSDEC officials, two methods would be considered bringing the DO concentrations up to 4.0 mg/l. Those include:

1. Increasing the spillage (or reaeration) at the dams along the Upp Hudson.

2. Reducing the allowable BOD in the effluent from the large discharger or dischargers.

The first choice is in direct opposition to that which has been propo by recreational interests concerned with limiting the fluctuation of l water surfaces during the summer months.

The second choice, that of reducing the permit limits for BOD for largest single discharger or several dischargers is more likely and the impacts of such a solution are discussed herein.

The DO concentrations predicted by the NYSDEC model for a du MA7CD/10 flow are calculated under the assumption that all wa treatment plants are actually discharging the average amount of BOD al under their respective permits at the time that the MA7CD/10 flow occu current permit limits on BOD have been established by NYSDEC at level wh will utilize all the available DO in the stream above the 4.0 mg/l DO and under the existing MA7CD/10 flow. If the MA7CD/10 flow is reduced, wa occur if a 6 foot drawdown constraint were imposed at Great Sacandaga Lak the discharge permit limits for BOD would also have to be reduced to ensu that the DO standard is not violated.

In order to estimate the required reduction in BOD, a number of DO calculations were made. These calculations indicate that discharges to t river in the reach between Glens Falls and a point just below Bakers Fal (Mile Point 201-195) exert the greatest influence on DO levels betwe Waterford and Troy.

Five wastewater treatment plants discharge to the river in this area follows:

- Finch Pruyn - This wastewater treatment plant provides seconda treatment to wastewater from pulp and paper manufacturing.

- Crown Zellerbach - A primary treatment plant is presently being upgraded to provide secondary treatment for paper manufacturing wastewaters.

- Glens Falls - A new, secondary wastewater treatment plant is under construction at the site of an existing primary [illegible] It will treat municipal wastewaters from Glens Falls, Queen[illegible] and South Glens Falls plus pretreated wastewaters from [illegible] Ciba-Geigy Corporation.

- General Electric Company - [illegible] compounds from the wastewater st[illegible] this plant is negligible in comparison to the other [illegible] in the area.

- Scott Paper Company - A secondary treatment plant [illegible] its location treats paper manufacturing wastewa[illegible]

Table 4.1 shows, for the four largest plants, the current or proposed SPDES limits for effluent BOD, the monthly average BOD discharge as reported to NYSDEC in 1983, and the estimated allowable BOD discharge limit under the reduced, MA7CD/10 flow which would result from a 6 foot drawdown constraint at the Great Sacandaga Lake. The General Electric plant discharge limit is less than 100 pounds per day, and the actual discharge is reported to be less than 15 pounds per day. This is not significant when compared to the large plants.

As shown in the table, the existing SPDES permits allow the discharge of [illegible],264 pounds per day from the four large plants as an average over any month. Currently, these plants discharge a combined average of about 20,400 pounds per day or about 63 percent of the total allowable discharge to that reach of the river. Two plants currently discharge more BOD than their permits allow. However, the permit limits for these plants are based on the assumption that secondary treatment facilities will soon be on-line and that the BOD in the treated effluent will drop significantly below what is currently being discharged. As noted in Table 4.1, the actual BOD effluent will drop to 11,700 pounds per day or to about 36 percent of the total allowable discharge.

Under a reduced MA7CD/10 flow, the monthly average BOD discharge from the four dischargers would have to be decreased by about 7,300 pounds per day to a

total of approximately 25,000 pounds per day - a reduction of approximately 2[illegible] percent. The reduced permit limit for each discharger, shown in Table 4.1, has been calculated under the assumption that each of the four treatment plants will be required to accept an equal percentage reduction in its discharge limit. Whether this would, in fact, be the case or whether the entire reduction would be achieved by revising the Finch Pruyn plant limit would depend upon NYSDEC. In either case, none of the plants would be impacted to the extent that new facilities would have to be constructed immediately. However, all would undoubtedly express concern over the loss of [illegible],300 pounds per day of BOD assimilative capacity of the river and in particular, the potential future effects on their capacity to expand.

Lower Hudson - According to the NYSDEC's existing model, DO standards in the Capital District area would be violated under the existing MA7CD/10 flow if all treatment plants were discharging at their permit limits. Under a reregulated MA7CD/10 flow, the BOD discharge from wastewater treatment plants in this area would have to be reduced by about 2,200 pounds per day.

The major wastewater treatment plants which discharge to the Hudson in the Albany area are the Albany County Sewer District's North and South Wastewater Treatment Plants and the Rensselaer County Sewer District No. 1 Plant. The current SPDES permit limits for BOD from these plants are compared to their reported, 30-day average BOD discharge levels for 1983 in Table 4.2. As shown in this table, the actual pounds of BOD in the discharges from these three plants are currently well below that which is allowed by permit, and will remain well below any reduced permit limits resulting from a reregulated MA7CD/10 flow. However, it should be noted that the current SPDES permit limits on BOD and the estimated limits which would apply under a reregulated MA7CD/10 flow would result in a violation of DO standards in the Hudson if all plants were discharging at their permit limits.

P Part I

4.2.2 Toxic Substances

The NYSDEC has established an allocation for toxic substance discharges from municipal and industrial wastewater treatment plants to the Hudson River basin. This allocation is based on the existing MA7CD/10 flow and current estimates of allowable levels of each toxic in the river. These allowable levels are based on protection of human health and aquatic life. In general, the standards required to protect aquatic life are considerably more stringent than drinking water standards. Information on existing discharges was obtained from municipal pretreatment programs, sampling data, and Part 'C' applications under the USEPA consolidated permits program.

The allocations will be incorporated into the individual wastewater treatment plant SPDES permits as they come up for renewal. It should be noted that the allocations are relatively conservative in that substances entering the Upper Hudson and/or Mohawk Rivers are assumed to be transported to the Lower Hudson. Therefore, the allocated load in the Upper Hudson and Mohawk River basins are often lower than the allowable load in order to avoid exceeding the allowable load in the Lower Hudson.

Table 4.3 presents the allowable toxic loading, as determined by the NYSDEC, on the basis of the existing and reregulated MA7CD/10 flows for those standards and criteria that will be impacted by the reduction in flows. Also indicated is the total loading that has been allocated to the wastewater treatment plants. Of the substances listed in Table 4.3, chloroform, PCB, chromium (+6), copper, cadmium and silver are considered to be high priority toxics by the NYSDEC.

Table 4.4 shows the percentage removal of the high priority toxic discharges required to meet NYSDEC's allocation under the existing MA7CD/10 flows and the percentage removal required under a reregulated MA7CD/10 flow. As shown in this table, a significant reduction in toxic substance discharges will be required to meet the allocated loads under the existing MA7CD/10 flow. The reregulated MA7CD/10 flow would require a reduction in the total allowable discharge load for each substance of about 9 percent, and increase the

percentage removal required by the various treatment plants from 0.1 percent, depending upon the substance.

Table 4.5 identifies the existing wastewater dischargers which will probably be effected by the new toxic discharge limits. This table includes discharges to the entire Mohawk and Hudson River Basins.

4.3 IMPACTS ON DRINKING WATER SUPPLIES

A decrease in water quality can affect the typical drinking water treatment processes of coagulation, sedimentation, filtration, and disinfection. The color and turbidity of the water, the chemical characteristics of the water, and the water temperature are the water source parameters that can influence the coagulation process. In general, as water quality decreases, the amount of chemicals required for coagulation increases. However, the exact relationship between the water quality and coagulant dosages for each of water treatment plants using the Hudson River as a raw water source can only be established through laboratory testing.

Sedimentation is directly affected by the efficiency of the coagulation process and the concentration of solids in the water source. It is expected that a decrease in water quality would result in an increase in the amount of sludge and possibly a slight increase in the solids concentration of the sedimentation basin effluent.

The filtration process would also be affected by a decrease in water quality. Increased carryover solids from the sedimentation basin would result in shorter filtration runs and increased backwash requirements. Finished water quality may also decrease. Additional chlorine may be required to adequately disinfect the finished water.

In addition to the water parameters that can be affectively handled by the typical water treatment processes, there are several parameters that may substantially pass through a typical water treatment plant. Toxic substances such as dissolved heavy metals and pesticides, and non-toxic substances such as hardness and salinity are not substantially removed or reduced by the typical water treatment processes. Other toxic substances, such as PCBs, may only be partially removed by typical water treatment processes.

4.3.1 Upper Hudson River

Impacts of a reduction in low flows is dependent upon the location of the water treatment plant. Based on data presented in previous sections, toxic

may be harmful to persons with heart or kidney diseases. The taste threshold is about 400 mg/l for the average person; while taste sensitive people can detect a salty taste at concentrations of 100 mg/l. Just because a taste is detected, it is not necessarily an objectionable taste. Most people prefer water with some mineral content; distilled water tastes objectionably flat.

During average summer periods, the salt front is downstream from Poughkeepsie, and therefore, the chloride concentrations would be well below the 250 mg/l drinking water standard. During dry summers when the MA7CD/10 occurs, the salt front could move above Poughkeepsie. However, the average chloride concentration should be below the drinking water standards. The Highland water treatment plant, which is located across the Hudson River from Poughkeepsie, would be affected to a similar degree.

During summer periods of average run-off, the salt front is approximately located at Chelsea and the chloride concentrations at the intake would be less than the drinking water standard. Under the conditions of the reregulated MA7CD/10 flow and with the Chelsea Pump Station operating, the average chloride concentrations could approach 1,000 ppm at the intake. However, because of dilution with water from the Delaware Aqueduct, chloride concentrations between 900 ppm and 1,250 ppm are acceptable at Chelsea without exceeding 250 mg/l at New York City's West Branch Reservoir. Further dilution occurs prior to the water's entry into the city's distribution system.

In summary, the available data indicates that the Poughkeepsie and Highland water supply should not experience chloride concentrations higher than the drinking water standards during normal and drought years. The Chelsea water supply should meet standards during normal years and marginally meet standards during a year in which the reregulated MA7CD/10 flow occurs. The reduction in low flow increases the chloride concentrations at Chelsea by 100 mg/l during the MA7CD/10 which, after dilution, translates to a 15 mg/l increase.

Chlorides are not substantially affected by the typical water treatment processes of coagulation, sedimentation, and filtration. If chloride

substances have not been detected during low flows in the Hudson River concentrations higher than the drinking water MCLs.

For the Queensbury Water Treatment Plant, the reregulated flow represents a 15 percent reduction of the existing MA7CD/10 flow and a percent reduction of the average summer flow. This translates to corresponding reduction in the amount of dilution and assimilation of man-made pollutants. There are only two major sources of man-made pollutants upstream of the Queensbury Water Treatment Plant, and they are located 8 miles upstream of the intake. Neither plant has a current permitted discharge for toxic substances. In addition, analyses of the NYSDEC's baseline load for toxic substance allocation, presented in Table 4.5, indicates that, for the Upper Hudson, the baseline load will be less than the recommended drinking water standards and criteria. Therefore, no significant impacts on the Queensbury Water Treatment Plant are foreseen due to toxic substances as a result of reduction in the MA7CD/10 flow. Minor operational impacts may occur because of the reduced dilution of suspended solids and coliform bacteria from upstream wastewater discharges and non-point sources. The increase in raw water suspended solids concentration based on a reduction in MA7CD/10 and average summer flow is estimated at 0.15 mg/l on the basis of an average permitted suspended solids discharge at the upstream wastewater treatment plants.

The reregulated MA7CD/10 and average summer flow at Waterford are only slightly higher than the flow that will occur at Queensbury. However, there are a significant number of municipal and industrial wastewater treatment plant discharges to the Hudson River that occur between Queensbury and Waterford. Suspended solids concentrations could increase by 0.7 mg/l on the basis of the average permitted suspended solids discharges at upstream wastewater treatment plants.

The impact at the Waterford Water Treatment Plant resulting from possible increases in concentrations of toxic substances during low flows in the river water is difficult to quantify. The only permitted discharges of toxic substances in the Upper Hudson Basin include the G.E. Capacitor Products Plant

and Chase Bag Plant in Hudson Falls, the G.E. Silicone Products Plant in Waterford, Lydall, Inc. on the Hoosic River, and the Hollingsworth and Vose Plants on the Battenkill. Current maximum permitted discharges, when diluted by the reregulated MA7CD/10 flows, are below the MCLs and recommended guidelines for drinking water. In addition, the NYSDEC's baseline toxic load is less than the recommended drinking water standards and criteria. During low flows, PCBs in the water column would be below the 1 ug/l State guideline for drinking water while other toxic substances have not been detected at levels greater than the MCLs during periods of low flow.

In summary, no significant impacts are foreseen on the quality of the drinking water supplies at Waterford and Queensbury. However, an increase in operational requirements is expected at both plants due to slightly higher concentrations of suspended solids in the river.

3.2 Lower Hudson River.

The drinking water intakes on the Lower Hudson are located in a 30-mile stretch between Fishkill and Rhinebeck. Rhinebeck is about 60 miles downstream from the Troy Dam, and the reduction in the MA7CD/10 flow in this area does not represent as significant a portion of the total flow as in the upstream reaches of the river.

As previously discussed, the main water quality concern for the water treatment plants on the Lower Hudson is the location of the salt water front during low flow periods. The salt front is predicted to move 2 to 4 miles upstream because of the reduction in flows. This salt front movement will have an impact on the chloride levels at the Chelsea Pumping Station and the Poughkeepsie, Castle Point, and Highland Water Treatment Plants. Table 4.6 shows the increase in chloride concentrations which are predicted to occur at these water supply stations. The Hudson River Psychiatric Center, Port Ewen and Rhinebeck Water Treatment Plants should not be affected by the salt front movement.

The recommended chloride limit of 250 mg/l in drinking water is based on taste rather than health considerations, although high chloride concentrations

concentrations become unacceptable either advanced, treatment techniques such as ion exchange or reverse osmosis would be required for a portion of the water supply or an alternate source of supply would be required to dilute the chloride concentration of the conventionally treated river water. The Castle Point VA Hospital and Highland Water District have alternate sources of supply.

The Castle Point VA Hospital uses well water to dilute the river supply to a chloride concentration of 100 ppm because of concern for patients on low salt diets. However, the hardness of the well water adversely affect the operation of the domestic hot water heat exchangers and boilers. The VA Hospital is currently constructing a new 0.15 mgd water treatment plant. This plant will include a small reverse osmosis unit that will serve as a back-up to the well water system.

The reregulation of flows will result in an average increase in chloride concentrations at the VA Hospital of about 45 ppm during average summer periods. During drought periods, the concentration could increase by 100 ppm. These increases would be even higher if the Chelsea Pump Station were operating.

4.4 IMPACTS ON INDUSTRIAL WATER SUPPLIES

The impacts of a reduced MA7CD/10 low flow on industrial water supplies along the Upper Hudson River are expected to be similar to those discussed for drinking water supplies. No significant change is expected in the chemical constituents which affect the use of water for cooling or process requirements. The pulp and paper industries and chemical industries which treat their supply prior to use may experience a slight increase in operational requirements depending upon the type of treatment provided. In general, a slight increase in sludge handling will occur. This could be in the form of increased solids removal from sedimentation basins, increased backwashing requirements for filters or both.

Below the Troy Dam, impacts are predicted to be very slight for most industrial water users. No appreciable change in water quality is expected except for a slight increase in chloride concentrations in areas affected by the salt front movement. However, the only industrial water use in that area is for cooling, and the equipment should not be adversely affected by a minor increase in salinity. It should be noted that several industries indirectly use Hudson River water by obtaining their industrial water supply from Poughkeepsie's municipal water supply system. IBM, in particular, has recently installed a reverse osmosis system that is used in conjunction with its dionization water plant. The reverse osmosis system runs throughout the year, and it is not expected that the reduction in Hudson River flow will adversely affect the operations of the facilities.

4.5 IMPACTS ON THERMAL PLANTS

All of the thermal electric plants on the Hudson River are located south of Troy along the tidal portion of the river. These plants utilize large volumes of river water for cooling purposes. Discussions with representatives of these power plants and with representatives of NYSDEC indicate that a reduction in the MA7CD/10 low flow will have little, if any, measurable impact upon the operation of these power plants or upon the temperature of the water in the river.

An analysis of the effects of cooling water discharge from the Niagara Mohawk plant at Glenmont indicates that, at a peak heat rejection rate of 1.66 x 10^9 kilo calories per hour, the temperature of the river water is increased by 0.22^{o} C. at the current MA7CD/10 low flow of 3,000 cfs. At a reregulated low flow of 2,740 cfs the temperature rise would be 0.24^{o}. The remaining thermal electric power plants are all located south of Poughkeepsie where tidal flows are very large in comparison to freshwater flows.

4.6 IMPACTS ON NAVIGATION

A recent study[1] evaluated the effects of reregulation of the Hudson River flows within a range of 800 to 2,600 cfs on navigation in the Champlain Canal. The report concluded that no adverse impacts to navigation would occur because no low flow related navigation problems had been documented and Hudson River flows would be maintained above the diversion requirements of the Glens Falls Feeder Canal.

Adverse impacts to navigation would only occur if withdrawals at the Glens Falls Feeder Canal were significantly curtailed in order to maintain water quality in the Hudson River. This situation is not likely to occur since the New York State Department of Transportation has first priority in the use of Hudson River water to operate its lock structures.

In general, a mature river such as the Hudson River is in a dynamic state of equilibrium with its basin. The sediment entering the river via stormwater run-off neither greatly exceeds or falls below the transport ability of the river. The reduction in Hudson River flows during the summer months could upset the equilibrium and reduce the natural transport of sediment out of the Upper Hudson River Basin. As such, the dredging requirements of the Champlain Canal, which have been estimated at 17,000 cubic yards annually over the next 10 years, could increase. The decreased sediment transport that would occur is estimated at 600 cubic yards per year.

The curtailment of water releases from the Sacandaga Reservoir on Sundays and holidays has the potential for causing slight navigation problems in the lower reaches of the Upper Hudson. On late Sunday and Monday, less water is available for lockages, and consequently, a longer period is required to complete the lockages. However, canal traffic is generally light during this period. Under the reregulated flow, the weekend flow will remain the same and navigation is not expected to be curtailed to any greater degree than that currently experienced.

[1] Lawler, Matusky & Skelly Engineers, Hudson River Basin Reservoir Reregulation - Economic Analysis - prepared for USCOE, August 1976.

4.7 IMPACTS ON RECREATION

4.7.1 Swimming and Boating

The Upper Hudson River is essentially impounded above the Glens Falls Feeder Canal and between the Troy Dam and Lock 7 of the Champlain Canal at Fort Edward. These impoundments serve to maintain water levels even though the river flows are reduced. A reduction in river flows is not expected to physically limit the use of existing swimming and boating facilities. Adverse impacts would occur if water quality were to degrade as a result of the reduced flow. For the reaches of the Upper Hudson River where the swimming areas are located, the water quality standard for dissolved oxygen is not violated under the reregulated flows. In these areas, a marginal aesthetic impact may occur because of the reduced dilution and assimilation of man-made and naturally occurring pollutants.

The river is tidal downstream from the Troy Dam and no significant change in water levels would occur as a result of the reduction of flows. The slight reduction in water quality in the Capital District Pool should not impact boating. No swimming areas are located in the Capital District Pool.

4.7.2 Fishing and Critical Habitats

Upstream of the Troy Dam, impacts on fishing would be associated with the reduction in water quality and DO levels resulting from a reduction in low flows. The diurnal fluctuations in water level which currently occur are not expected to be affected under the reregulated operating procedure. As such, fish spawning areas will still be subject to the adverse impact of fluctuating water levels. The impact resulting from a reduced dilution of toxic substances from both point and non-point sources is difficult to identify because of the number of unknowns involved with trace concentrations of toxic substances. In the Upper Hudson, the NYSDEC's allocated load for toxic substances is less than the allowable load for these substances except for BIS (2Ethyl-Hexyl) Phthalate. The allocated load for this substance exceeds the allowable load by a slight amount. However, the Hudson River bottom sediments also contain toxic substances, in particular PCBs, zinc, copper, cadmium, lead

and chromium. It is estimated that the impact of PCBs and other toxic metal in the bottom sediments and the existing water level fluctuation greatly exceed any impact that may result from the reduction in summer flows.

Downstream of the Troy Dam, impacts on fishing and critical habitat would be associated with the movement of the salt front and the reduced dilution of toxic substances. The Chelsea area is characterized by salinity fluctuations resulting from upstream and downstream movements of the salt front. Fish and biological communities present in this area are typical of the middle estuary and are adapted to those fluctuations in chloride concentrations.

In most cases the critical point for the NYSDEC's toxic allocation is the division between the freshwater and saline water in the Lower Hudson. Downstream of this division, the impact of reduced river flows would be negligible. Upstream of this division, the reduced dilution of toxic substances would have a slight impact on aquatic life. However, it is not possible to quantify this impact. For example, the allocated concentration of chromium is 0.050 mg/l under the existing MA7CD/10 and 0.100 mg/l under the reregulated MA7CD/10.

4.8 Impacts on Flooding

Although this report is primarily concerned with the identification and evaluation of impacts associated with reduced flows resulting from the proposed 6 foot drawdown constraints, mention should be made of the potential effects of such a policy on flooding. In order to minimize the occurrence of low flows in the Hudson under a 6 foot drawdown constraint, it will be much more important that the Sacandaga Reservoir be full at the beginning of the summer dry season then it currently is. This fact may cause the operators to begin filling at an earlier date than in the past and increase the potential for flood damage should a major spring storm occur. Furthermore, if the reservoir is only drawn down 6 feet during the summer instead of 12 feet, significantly less storage volume will be available to contain flows from a late summer or early autumn storm.

V. EVALUATION OF IMPACTS

5.1 GENERAL

The previous chapter of this report identifies and discusses a number of impacts which would be associated with the imposition of a 6 foot drawdown constraint on the operations of Great Sacandaga Lake between May 1st and September 30th. Where possible, the magnitude of a given impact has been estimated in terms of measurable engineering parameters such as dissolved oxygen levels, concentrations of toxic pollutants, etc.

This chapter of the report attempts to assess the value of the identified impacts in economic terms, or, where an economic evaluation is not feasible, in terms of a loss or gain resulting from the impact.

5.2 WASTEWATER TREATMENT PLANTS

5.2.1 Summary of Identified Impacts

A 260 cfs reduction in the existing MA7CD/10 flow in the Hudson downstream from Spier Falls will require that current SPDES permit limits on BOD in wastewater treatment plant effluents be reduced by a total of approximately 7,300 pounds per day for plants on the Upper Hudson in the Glens Falls to Bakers Falls area and by approximately 2,200 pounds per day for plants discharging to the Capital District Pool. Inasmuch as the present BOD load discharged by these plants is well below both the existing permit limits and those estimated to result from a reduction in the MA7CD/10 flow, no immediate upgrading of treatment facilities would be required due to the permit revisions. However, while stream standards will not be contravened by existing dischargers at the reduced MA7CD/10 flow, a reduction in water quality will occur. Furthermore, reduced permit limits on BOD could affect the ability of some of the existing plants to operate at full design capacity and/or discourage the expansion of industrial uses on the river.

* s/b Adjust SPDES discharge

New toxic waste discharge limits currently proposed by the NYSDEC would also be made more stringent under a reduced MA7CD/10 flow. These permit limits would affect wastewater treatment plants on the Mohawk, the Hoosic and other tributaries as well as those in the Hudson River itself. Under NYSDEC's method of allocating toxic waste discharges, a 9 percent reduction in the MA7CD/10 flow on the Lower Hudson will result in a 9 percent reduction in the amount of toxic substances permitted to be discharged to the Hudson and Mohawk River Basins.

2.2 Economic Impacts

Two methods have been considered for evaluating the economic impact of reductions in the permit limits for wastewater treatment plant BOD discharges. For the first method, it has been assumed that, while existing BOD discharges will not result in a contravention of stream standards at a reduced MA7CD/10 flow, a monetary value can be assigned to the reduction in water quality which will occur. A measure of this monetary value would be the cost of maintaining the same water quality at the reduced MA7CD/10 flow as occurs under the existing MA7CD/10 flow. This could be accomplished by reducing the current BOD discharges to the river by upgrading one or more treatment plants to achieve a higher degree of BOD removal.

It should be noted that a strict analysis of the cost of maintaining existing DO standards at all points along the river under a reduced MA7CD/10 flow would require that all plants curtail BOD discharges by some amount. However, the major areas of concern are the DO sag points in the Waterford to Troy Dam area of the Upper Hudson and the Ravena area below the Capital District Pool. The DO level in these areas are most affected by discharges in the Glens Falls to Bakers Falls area of the Upper Hudson and the Albany area of the Lower Hudson. Furthermore, any facilities designed to achieve additional BOD removal would also reduce suspended solids discharges significantly. Therefore, it is judged that the cost of increased BOD removals at one point in the Upper Hudson and one point in the Lower Hudson is a fair estimate of the cost of maintaining water quality.

On the Upper Hudson River, the current 30-day average BOD discharge in the Glens Falls to Bakers Falls area would have to be reduced by an estimated 1,830 pounds per day to avoid a reduction in downstream DO under the reduced MA7CD/10 low flow. This reduction could be achieved by additional treatment at one or more of the four large treatment plants in that area, but it is judged that the least costly method of doing so would be to add tertiary coagulation/sedimentation facilities at the Finch Pruyn plant. It is estimated that the cost of constructing additional facilities at the plant would range from $3,700,000 to $4,500,000 while operation and maintenance costs associated with the additional facilities would be between $900,000 and $1,100,000 per year. The equivalent annual cost of the increased level of treatment would be between $1,400,000 and $1,700,000 per year assuming a 12 percent interest rate on borrowed capital for 20 years. It should be noted that the additional facilities will provide a greater degree of treatment than that which is required. However, treatment of only a portion of the effluent can not be considered since split flows are not allowed.

On the Lower Hudson River, the current 30-day average BOD discharges to the Albany Pool would have to be reduced by 550 pounds per day to maintain downstream DO levels at their current state. This could be accomplished by upgrading one of the two Albany County Sewer District plants or the Rensselaer County Sewer District plant. For the purpose of this report, it has been assumed that the Rensselaer County plant would be upgraded through the addition of tertiary sand filters. The construction cost for this work is estimated to range from $10,000,000 to $11,100,000, while the additional operation and maintenance costs associated with these facilities are estimated between $1,800,000 and $2,000,000 per year. The equivalent annual cost over 20 years assuming a 12 percent interest rate on borrowed capital, would be between $3,100,000 and $3,500,000. As with the Upper Hudson, the additional facilities will provide a greater degree of treatment than that which is required.

As future development occurs along the Hudson River and wastewater discharges increase, the loss of BOD assimilative capacity due to a reduced MA7CD/10 flow will be of greater significance than under current conditions.

Recreational fisheries in the freshwater portion of the Lower Hud River include largemouth bass, smallmouth bass, brown bullhead, yellow per walleye, blueback herring, alewife, rainbow smelt, sunfish and black crapp Analysis of aerial overflights in the early 70's indicated an effort of 30,: angler days for recreation fishing(9).

The saltwater portion of the Hudson River contains a recreational fish for striped bass, white perch, blueback herring and white cutfish. An ann average of 135,000 angler days was estimated from the aerial overflights the early 1970's(9).

2.8.3 Sensitive Habitat and Wetlands Areas

The Champlain Canal south of Fort Edward and that portion of the Hud River between Fort Edward and Hadley contain small pockets of wetlands. lower Hudson River on the other hand, contains several wetlands and sensitive areas which provide shelter and spawning grounds for several commerc species.

Limited sensitive habitat information is available for the Hudson Riv upstream of Fort Edward. Consequently, sensitive habitats cannot documented here. The two official sensitive areas located on the Hudson Riv between Fort Edward and Hadley are located at a shoal just below Sherm Island and at a park area located in the town of Queensbury(5).

A detailed compilation of sensitive habitats is presented in Appendix There are 45 of these sensitive habitat areas. In general, shallow area particularly those which are vegetated, are valuable spawning and nurser areas. The mouths of tributaries, as well as the tributaries themselves ar likely spawning areas.

2.8.4 Stability of PCB Contaminated Sediments :

General Electric has used PCBs in the production of capacitors at For Edward since 1947. An additional plant was put into operation at Hudson Fall

in 1952. Prior to 1966, no records were maintained which reflected the amount of PCB used at these plants. Between 1966 and 1974, these facilities purchased 78 million pounds of PCB[6]. PCB discharges averaged 30 pounds per day into a river pool maintained by the Fort Edward dam in the early 1970's. In the late summer of 1973, this dam was removed allowing massive volumes of contaminated sediments to be resuspended and transported downstream. In April 1976, a 100-year flood caused further flushing and downstream transport. As a result, PCB laden sediments occur along the entire length of the river to varying degrees.

PCB can enter the water column from sediments primarily through two mechanisms: erosion and desorbtion. Erosion generally occurs during periods of high flow. The flood in April of 1976 resulted in increased PCB concentrations in the water column, primarily as a result of erosion. Desorbtion is the predominant mechanism at lows flows. Since the daily load is expected to be relatively constant, a lower flow could result in a higher dissolved PCB concentration. Desorbtion is the release of the PCB from the surface of the sediments they are absorbed on.

During the two extreme flow conditions, high and low flow, instability of PCB in both the particulate and dissolved phases is increased. The most stable condition is present during moderate flows. Based on 1977 to 1979 USGS data, average PCB concentrations at low (less than 7,000 cfs), moderate (7,000 - 20,000 cfs), and high flows (greater than 20,000 cfs) were 0.384 ug/l, 0.220 ug/l and 0.693 ug/l, respectively[10]. However, the low flow concentrations have decreased since 1979.

Estimates of the amount of PCB in the Upper Hudson River between Fort Edward and the Federal Dam at Troy have been tabulated and are presented in Figures 2.1 and 2.2[7]. Based on this information and additional information on PCB concentration south of the Battery[6], it appears that the PCB discharged at Hudson Falls and Fort Edward has been transported downstream, to varying degrees, along the entire length of the river.

flooding. By the middle of March the average reservoir level has dropped to about Elevation 744.

Upper Hudson River - Under the current reservoir operating procedures, during a year of average runoff, the flow at Spier Falls has generally ranged from 2,800 to 3,000 cfs for six days each week during the months of July, August and September. On Sundays and holidays, the flow is typically less than 1,000 cfs and consists of approximately 50 cfs from the Sacandaga River plus the flow in the Hudson at Hadley. The average flow during the summer months in the reach of the Hudson between the confluence of the Mohawk River and the Federal Lock and Dam in Troy is slightly in excess of 4,100 cfs.

The minimum average 7 consecutive day flow with a recurrence interval of once in 10 years (MA7CD/10) is used by the NYSDEC to establish limits on the discharges from wastewater treatment plants. This flow has been determined by the NYSDEC to be 1,760 cfs at Spier Falls and 2,729 cfs just upstream from the Troy Dam. The historic data utilized by NYSDEC in determining the MA7CD/10 flow indicates that in most years, the 7 day low flow has occurred during either the July 4th or Labor Day period when no releases were made from the Sacandaga on two days out of seven.

Lower Hudson River - Regulation of the Great Sacandaga Lake impacts the entire Lower Hudson River extending from the Troy Dam to the Battery in New York City. However, as compared to the Upper Hudson River, the discharge from the lake represents a smaller portion of the tributary flow to the Lower Hudson River.

Below the Troy Dam, the net downstream flow of the Hudson River varies with the freshwater discharge to the river (generally 2,000 to 40,000 cfs) and the tidal influx (300,000 to 400,000 cfs). The river actually flows upstream during flood tides. The Hudson River between the Troy Dam and the salt front has been compared to a large freshwater reservoir because of the relatively slow net downstream movement. The average flushing rate for this "reservoir" is about five months. During the summer, the average flow over the Troy Dam is about 4,100 cfs. The MA7CD/10 flow for the Lower Hudson, as determined by the NYSDEC, is 3,000 cfs.

3.2.2 Existing Water Quality

Hudson River water quality is directly related to the flow because of the relatively fixed input of pollutants entering the river from municipal and industrial sources. At high flows, dilution of the pollutants occurs and many pollutants can be assimilated by the river, thereby mitigating adverse impacts to the river and aquatic life. However, these impacts become a matter of concern during low flow periods when the dilution is not as great and the river's capacity to assimilate pollutants is approached or exceeded.

Dissolved Oxygen - Of particular concern is the effect of pollutants on the dissolved oxygen (DO) concentration of the river. Low DO levels contribute to an unsuitable environment for fish and aquatic life, and the absence of DO can cause anaerobic decomposition to occur in the river. Quality standards for the Hudson River specify the minimum DO levels depending upon the designated use of the river. Table 3.1 indicates the classification and associated minimum DO levels for the various reaches of the Hudson River and the designated use for the different classifications.

The NYSDEC utilizes a computer program to evaluate the effects on dissolved oxygen resulting from pollutants discharged to the river. Inputs to the program are equivalent BOD discharges from municipal and industrial wastewater treatment plants and the river flow. Output from the NYSDEC's program, which is based on the existing MA/CD/10 flow and the SPDES permitted BOD discharges from the treatment plants located along the Upper Hudson River, indicates that the DO concentration decreases from about 6.7 mg/l at Palmer Falls to about 4.0 mg/l at the Troy Dam.

The DO sag model for the Lower Hudson has not been updated since 1977. At that time, the reaeration and decomposition rates were based on data obtained in the mid-1960's which was prior to the construction of the Albany and Rensselaer sewage treatment plants. Based on Best Practical Treatment (BPT) treatment, the model indicated that the dissolved oxygen concentration would drop below the 4 mg/l DO standard for an 18 mile length between Mile Point 145 and 127. A minimum DO of 2 mg/l was predicted to occur at Mile Point 138. Downstream of Mile Point 125, the DO concentrations are well above

99.3 percent of cadmium discharges based on the current MA7CD/10 flow in the Hudson. Under the reduced MA7CD/10 flow which would occur under a 6 foot drawdown constraint, the required percentage removals would increase to 77.3 percent for chromium and 99.4 percent for cadmium as shown in Chapter IV.

As the existing SPDES permits for the affected wastewater treatment plants come up for renewal, detailed studies will be required to determine the most cost-effective means of reducing toxic discharges at each plant. Possible methods might include process modifications in manufacturing plants, side stream treatment, elimination of products which result in toxic discharges, additional wastewater treatment, and a number of other options. Because of the many options which might be available for the reduction of toxic discharges, and the large number of treatment plants involved on the Hudson and its tributaries, it is very difficult to evaluate the economic impact of the additional removal requirements related to the reduction in the MA7CD/10 flow.

The NYSDEC has recently prepared a preliminary estimate of the state-wide cost of removing copper, zinc and cadmium from wastewater discharges. This estimate is predicated upon the addition of sand filters to polish the effluent from plants which already utilize chemical precipitation and settling processes to remove most of their metals. This method of treatment would be expected to produce an effluent which would meet the proposed new standards under the current MA7CD/10 flow, and, through careful operation, should also meet standards under a reduced MA7CD/10 flow. Thus, if a plant successfully implements its toxic discharge reduction program, the additional costs associated with a reduced MA7CD/10 flow would be primarily operation and maintenance costs.

In order to estimate the operation and maintenance costs associated with the reduction in MA7CD/10 flow, it is first necessary to estimate the operation and maintenance costs at the current MA7CD/10 flow. Operation and maintenance costs were not addressed in the NYSDEC cost estimate but have been developed herein under the following assumptions:

- Municipal wastewater treatment plants will require the removal of toxic substances at their source through an industrial pretreatment

program rather than through the addition of treatment facilities at the municipal plant.

- o Industrial discharges with flow rates less than 500,000 gpd will add sand filters capable of treating their entire discharge.
- o Industrial discharges with flow rates greater than 500,000 gpd will filter only a portion of their total discharge.

Based upon the NYSDEC inventory and the above assumptions, it is expected that 8 plants in the 0 to 200,000 gpd size range, 6 in the 200,000 gpd to 500,000 gpd range and 38 plants with flows greater than 500,000 gpd will be affected by the new toxic standards. The capital cost for the construction of sand filters has been estimated by NYSDEC as follows:

Design Flow Rate	Estimated Capital Cost
0 - 200,000	28,000 - 150,000
200,000 - 500,000	160,000 - 255,000
GT 500,000	255,000 - 480,000

Operation and maintenance costs for tertiary sand filters have been evaluated by the USEPA and generally range from 16 to 17 percent of the capital cost of the filter system. The cost of disposing of the substances removed by the filters would add an additional 3 to 4 percent of capital cost to this amount.

For the purposes of this report, it has been assumed that the annual operation and maintenance cost for meeting NYSDEC's proposed standards under the existing MA7CD/10 flow will be approximately 20 percent of estimated capital cost of constructing the sand filter systems or approximately $3,900,000 per year. It is further assumed that a two percent increase in operation and maintenance costs would be incurred to meet the more stringent standards required under a reduced MA7CD/10 flow. Under these assumptions, the additional cost of toxic substance removals associated with a reduced MA7CD/10 flow would be approximately $80,000 per year.

It should be noted that, if tertiary sand filters are added to some industrial wastewater treatment plants for toxic substance removals, some

reduction in BOD and suspended solids discharges will also be achieved. However, the largest BOD and suspended solids dischargers are municipal treatment plants where no tertiary filters are anticipated and paper mill plants such as Finch Pruyn and Co. which generally do not discharge toxic substances which can be removed by tertiary sand filtration.

5.3 MUNICIPAL AND INDUSTRIAL WATER SUPPLIES

5.3.1 Summary of Identified Impacts

A reduction of approximately 260 cfs in the MA7CD/10 flow and 600 cfs in the average flow from late June through the end of September will result in a slight increase in the current toxic substances and suspended solids concentrations in the upper and lower reaches of the river. The increase in the concentrations of toxic substances is not expected to be sufficient to contravene drinking water standards, and, as the NYSDEC revises existing permit limits for toxic discharges from wastewater treatment plants, will be reduced to a level below that which currently exists. The increase in suspended solids concentrations is expected to result in a slight increase in operation and maintenance costs at those water treatment plants on the Upper Hudson that treat for solids removal. On the Lower Hudson, the increase in suspended solids would be negligible and is not expected to affect the water supply plants.

Additional impacts on water supplies are associated with a slight upstream movement of the salt front during periods of lower flows. This movement is more significant when the Chelsea pumping station is operating.

5.3.2 Economic Impacts

Economic impacts for the municipal water treatment plants located on the Upper Hudson would be associated with the increased operating expenses for the coagulation/sedimentation, sludge handling and chlorination processes. To estimate these increased costs, a suspended solids concentration basis was utilized. The percent increase in suspended solids during average summer flows resulting from the average discharge of suspended solids from the

upstream wastewater treatment plants was determined and compared with the average annual Hudson River suspended solids. This percentage increase was applied to USEPA cost curves for the various unit processes to determine the increase in operating costs.

The design capacity of the Queensbury Water Treatment Plant is 5 mgd. The suspended solids concentration in the Upper Hudson would increase by 1 percent on the basis of an average permitted discharge of suspended solids from the upstream wastewater treatment plants. The estimated increase in annual operating costs at the design flow for coagulation/sedimentation, sludge handling and chlorination at the Queensbury Plant is about $1,000. It should be noted that the current average production at the Queensbury Plant is about 1.6 mgd.

The design capacity of the Waterford Water Treatment Plant is 2.8 mgd. The suspended solids concentration in the Hudson River would increase by 5 percent on the basis of an average permitted discharge of suspended solids from the upstream wastewater treatment plants. The estimated increase in annual operating costs at the design flow for coagulation/sedimentation, sludge handling, and chlorination at the Waterford Treatment Plant is $2,800. The current average production of the Waterford Treatment Plant is about 1.7 mgd.

Scott Paper Company and Tagson's Papers, Inc. are the only industries on the Upper Hudson that provide treatment for suspended solids removal prior to discharge. In both cases, sand filtration is provided. Economic impacts associated with the reduction in average summer flows were estimated in similar fashion to those for the drinking water treatment plants on the Upper Hudson. The annual increase in average operating costs based on design capacity are estimated at:

Tagson's Papers, Inc. - $1,100

Scott Paper Company - $2,000

Economic impacts for the drinking water supplies located on the Lower Hudson would be associated with the increased expenses for mitigating the

xpected increase in chloride concentration resulting from an upstream ovement of the salt front. The Port Ewan and Rhinebeck Water Treatment lants are located well above the salt front. The Hudson River Psychiatric enter is located close to the salt front during drought years but the hloride concentrations should be below the 250 mg/l drinking water standard. herefore, the economic impact on the above plants should be minimal.

The salt front reaches the Poughkeepsie and Highland Water Treatment lants during dry years. The reduction in Hudson River flows would result in 30 mg/l increase in average chloride concentrations during dry years. owever, the average chloride concentrations would still be below the drinking ater standard of 250 mg/l.

The increased salinity resulting from the salt front movement would have n economic impact on the Castle Point VA Hospital. Due to patients' health equirements, a drinking water chloride concentration of 100 mg/l is required. ell water is used to "dilute" the treated Hudson River water and a reverse smosis system serves as a back-up to the well water system. Economic impacts ssociated with the increased salinity were estimated by determining the ditional amount of water that would require treatment by reverse osmosis to aintain the hospital's 100 mg/l drinking water concentration under the sting average summer flow and reregulated average summer flow. The annual erating cost for a reverse osmosis system at a flow representing this ditional difference would approximate the economic impact. Based on USEPA curves for reverse osmosis, the reregulation of Hudson River flows would an estimated annual economic impact at the Castle Point VA Hospital of ,200.

.4 NAVIGATION

.4.1 Summary of Impacts

The reregulation of Hudson River flows can be expected to result in a light increase in the maintenance dredging requirements of the Champlain

5.4.2 Economic Impacts

It is estimated that an additional 600 cubic yards per year of sediment might have to be removed from the Champlain Canal during maintenance dredging by the New York State Department of Transportation. This increased dredging requirement is estimated to cost approximately $12,000 per year, provided that the area to be dredged does not already contain significant concentrations of PCBs in the sediments. If PCB contaminated sediments were involved, the dredging cost would be much higher.

5.5 RECREATION

5.5.1 Summary of Impacts

On the Upper Hudson, a marginal aesthetic impact on swimming and boating may occur because of the reduced dilution and assimilation of man-made and naturally occurring pollutants. Aquatic life would also be impacted for the same reasons. Recreational fishing could also be reduced because of the aesthetic and aquatic life related impacts.

On the Lower Hudson, a marginal aesthetic impact on boating may occur in the Capital District Pool because of the reduced dilution and assimilation of pollutants. Aquatic life may also be impacted in this area. Downstream of the Capital District Pool, the impacts on recreation would be negligible.

5.5.2 Economic Impacts

No economic impact is estimated for swimming and boating in the Upper Hudson. Flows significantly less than the reregulated low flows occur on weekdays and holidays, which would be the peak use periods.

Fishing is currently prohibited on the Upper Hudson from the Troy Dam to Fort Edward, and the reregulation of flow would not affect this condition. However, a long-term reduction in summer flows would have an economic impact on recreational fishing above the former Fort Edward Dam site. The level of this impact would depend upon development of the recreational fishery in this

area, the amount of additional wastewater treatment provided in response to the reduction in MA7CD/10 flows, and the degree to which the existing diurnal water level fluctuations could be dampened.

On the basis of previous estimates[1], the future recreational fishery potential of the Upper Hudson, from the Troy Dam to Hadley, is estimated at $1.65 to $2.25 million a year. Because of the ban on fishing from between Troy and Fort Edward, very little of this potential is currently realized. If this ban is lifted at some time in the future, the reduction in flow required to comply with a 6 foot drawdown constraint would be more significant than at present.

On the Lower Hudson, no economic impact is estimated for swimming or boating. In addition, no economic impacts on fishing are estimated for the area downstream of the Capital District area. As with the Upper Hudson, a long-term reduction in summer flows would have an economic impact on fishing in the Capital District area and would depend upon similar considerations. However, the impact would be less than that on the Upper Hudson. Based on previous estimates[1], the Capital District area (Mile Point 120 - 154) has an estimated recreational potential of $5.3 million to $7.9 million of which only an estimated $45,000 per year is currently realized. The reduction in summer flows in this area should have little affect upon the current use of this reach of the river but could have an affect upon the ultimate realization of the potential use.

5.6 SUMMARY

The previous sections of this report present the economic impacts on the various users of the Hudson River resulting from a reduction in summer flows. These impacts are summarized below:

- The MA7CD/10 flow will be reduced by 260 cfs, the average summer flow will be reduced by 600 cfs.

[1] Sheppard, Douglas J., Evaluation of the Hudson River Fishery Resources: Past, Present and Future, NYSDEC Department of Fisheries, April 1976.

- In general impacts on wastewater treatment water supply and recreation would be associated with the reduction in dilution and assimilation of natural and man-made pollutants introduced to the Hudson River.

- The salt front will move one to two miles upstream and even further if the Chelsea Pump Station is operating.

- The initial annual economic impact on wastewater treatment would be between $4,500,000 and $5,200,000. This impact could ultimately increase to $7,280,000 annually.

- The economic impact on water supplies is estimated at $16,000 annually.

- The economic impact on navigation is estimated at $12,000 annually. D plants.

- No significant impact will be experienced at the thermal power

- No economic impact is estimated for swimming or boating although a marginal aesthetic impact may be experienced.

- An economic impact is foreseen on recreational fishing. However, a value can not be estimated until a number of environmental issues are resolved (in particular PCBs) and the recreational fishery potential of the Hudson is fully developed.

As indicated above, the quantifiable equivalent annual economic impact at discount rate of 12 percent on users of Hudson River flows would be between ,528,000 and $5,228,000 initially and could ultimately increase to ,308,000. Some studies prepared for the Hudson River-Black River Regulating strict have calculated various economic impacts on a present worth basis ng a discount (interest) rate of 6 percent. The initial 20 year present en at a discount rate of 6 percent of the economic impacts of a Hudson flow reduction would be between $45,800,000 and $52,200,000 and could imately increase to $71,900,000.

same disc. rate as above
SAC. growth = to ∞

KNOWN S..SITIVE HABITATS WITHIN THE STUDY AREA

Description	Habitat Value
Shoal just below Sherman Island	Major walleye spawning area.
Queensbury park and Camp Jadamada	Migratory waterfowl area; Freshwater wetlands; Abundant wildlife.
Hook Mountain State Park/ Rockland County	Rockspike moss reported, raptor migration ridge.
Croton Point and Marsh/Westchester County	Salt marsh plant species. Used by migratory and resident waterfowl Fish spawning area; species include striped bass, white perch, shad, herring smelt and tomcod. Migratory blue crab concentrations. Record of worm snake. Bald eagle sightings
Stony Point Marsh-Grassy Point/Rockland County	Used by migratory and resident waterfowl; fish and blue crab spawning, nursey and feeding area. Fish species include herring, alewife, smelt, tomcod, white perch, striped bass, and shad. Extensive cattail stands
Haverstraw Bay Area/Westchester-Rockland Counties	Major Atlantic sturgeon wintering areas. Shellfish beds, blue crab habitat. Significant migratory and resident fish area. Used by migratory waterfowl.
Peekskill to Poughkeepsie/ Rockland, Orange, Ulster, Westchester, Putnam and Dutchess Counties	Atlantic sturgeon spawning area.
Lake Meahagh/Westchester County	Spawning, nursery and feeding area for resident and anadromous fish. Species include herring, white perch, shad, yellow perch, and smelt.
South of Kingston/Ulster-Dutchess Counties	Shortnose sturgeon wintering area.

KNOWN SENSITIVE HABITATS WITHIN THE STUDY AREA

Description	Habitat Value
Esopus Meadows/Ulster County	Shoreline area with submerged vegetation used by fish and migratory waterfowl.
Sleightsburg Marsh/Ulster County	Unusual insect species in marsh area; heartleaf plantain habitat; anadromous fish spawning, nesting and feeding area in lower Rondout Creek; species include herring, striped bass, white and yellow perch and shad.
Kingston Point Marsh and Kingston Flats/Ulster County	Marsh and Roundout Creek used for anadromous fish spawning, nesting and feeding area; species include striped bass, shad, herring and large mouth and small mouth bass; possible habitat for goldenclub and map turtle; flats are mid-river shallows used by waterfowl, shad and other fish.
Astor Cove/Dutchess County	Wild rice, wild celery and other valuable waterfowl foods; osprey sighting.
Glenerie Gorge/Ulster County	Valuable plant and wildlife habitat for rare species.
Mudder Kill/Dutchess County	Goldenclub, leopard frog.

KNOWN SENSITIVE HABITATS WITHIN THE STUDY AREA

Description	Habitat Value
Tivoli Bay North and South, Cruger and Magdalen Islands/Dutchess County	Goldenclub; bur marigold, possibly Nuttall's micranthemum, extensive cattail stands; snapping turtles; shorebirds; osprey and eagles during migration; waterfowl nesting and resting area; historic Indian site; part of proposed Federal estuarine sanctuary and nominated as experimental ecological reserve.
Esopus Creek Estuary and Marsh, Green and Upper Flats/Ulster-Columbia Counties	Estuary and marsh have goldenclub and heartleaf plantain; also used for fish spawning, nursery and feeding area - species include striped bass, white perch, herring smelt and large mouth and small mouth bass; mid-river flats contain emergent vegetation, mostly spatter dock, and are used as stopovers by black duck and other waterfowl.
Great Vly/Ulster-Greene County	Calcareous bog area containing extensive cattail stands.
Duck Cove-Inbocht Bay/ Greene County	Goldenclub and heartleaf plantain; waterfowl resting and feeding area; fish spawning and nursery area for herring, white perch, yellow perch and shad.
Roeliff Jansen Kill/Columbia County	Estuary area provides fish spawning feeding and nursery habitats for herring, white perch, and striped bass; upstream area used as trout and warmwater fishery.
Catskill Area/Greene County	Several goldenclub stands.

KNOWN SENSITIVE HABITATS WITHIN THE STUDY AREA

Description	Habitat Value
Ramshorn Creek Marsh/ Greene County	Extensive tidal swamp; goldenclub and heartleaf plantain; least bitter sighting; used by waterfowl; Nationa Audubon bird sanctuary in part.
Roeliff Jansen Kill to Catskill Creek/Columbia-Greene Counties	Significant resident and anadromous fish concentrations, species include herring, shad and perch.
Catskill Creek Estuary/ Greene County	Goldenclub and heartleaf plantain; fish spawning area, species include herring, striped bass, white perch American shad, and smelt; waterfowl resting area.
Rogers Island/Columbia County	Goldenclub, yellowheart (introduced) wild celery, wild rice; resting and feeding area for waterfowl and other birds; DEC wildlife management area.
Athens Marsh/Greene County	Stopover area for canvasback and possibly redhead ducks.
Middle Ground and West Flats/Columbia-Greene Counties	Possibly goldenclub.
Marshes/Columbia County	Possibly redhead ducks; extensive cattail stands in North Bay.
Middle Ground Flats to Stockport Creek/Columbia Green Counties	Significant resident and anadromous fish concentrations, species includ striped bass, sturgeon, herring and white perch.

KNOWN SENSITIVE HABITATS WITHIN THE STUDY AREA

Description	Habitat Value
Stockport Creek Estuary/ Columbia County	Stopover area for canvasback and possibly redhead ducks; fish spawning and feeding area, species inclu striped bass, herring and white perch; heartleaf plantain and possibly goldenclub; part of proposed Federal estuarine sanctuary.
Vosburgh Marsh/Greene County	Stopover area for canvasback and possibly redhead ducks; waterfowl feeding area; birding area; leaved astor reported; possible map turtle habitat.
Gay's Point Area/Columbia County	Goldenclub; map turtle.
Nutten Hook Area/Columbia County	Goldenclub.
Bronck Island Cliffs/Greene County	Bird resting area; possible goldenclub habitat.
Mill Creek Marsh/Columbia County	Waterfowl resting area.
New Baltimore to Troy/ Greene, Albany, Columbia and Rensselaer Counties	Shortnose sturgeon spawning area.
Coeymans Creeks Marsh/Greene-Albany Counties	Bird feeding and resting area; heartleaf plantain.
Houghtaling Island/Columbia-Greene County	Significant resident and anadromous fish concentrations, species include herring, white perch and American shad; map turtle.

KNOWN SENSITIVE HABITATS WITHIN THE STUDY AREA

Description	Habitat Value
Schodack Creek Marsh/ Columbia-Rensselaer Counties	Fish spawning, nursery and feeding area, species include white perch, American shad, herring and yellow perch; bird breeding, feeding and resting area.
Cliffs west of Shad and Schermerhorn Islands/ Albany County	Reports of cerulean warbler in this area.
Papscanee Creek Marsh/ Rensselaer County	Heartleaf plantain and possibly goldenclub; significant fishery habitat, fish species include American shad, striped bass, herring, and white perch; map turtle; bird, waterfowl and other wildlife.
Island Creek Marsh-Norman Kill/Albany County	Lower reaches valued for herring spawning and wetlands habitat; upper reaches support warm water fishery, such as bass and sunfish.
Wynants Creek and Poesten Kill/Rensselaer County	Herring spawning and warm water fishery.
Starbuck Island/Albany and Rensselaer Counties	Fish spawning area around island, species include striped bass, American shad, herring, and white perch.
Troy Dam/Albany and Rensselaer Counties	Significant resident and anadromous fish populations, species include striped bass and American shad; waterfowl wintering area.

RENSSELAER COUNTY SEWER DISTRICT NO. 1

FRED J. WURTEMBERGER, P. E.
ADMINISTRATIVE DIRECTOR

CLEAR WATER

COUNTY OFFICE BUILDING, TROY, N.Y. 1218
(518) 283 - 2235

March 16, 1984

John B. Mulligan, P.E.
Malcolm Pirnie, Inc.
11 Computer Dr. West
Albany, N. Y. 12205

Re: Hudson River-Black River Regulating District

Dear Mr. Mulligan:

The inventory form, transmitted to us on March 13, 1984 is returned herewith with no corrections.

The permit limit for EDC after June 1, 1984 is 28 pounds per day. We have requested a permit modification to phase the reduction over a longer period of time.

The plants along this stretch of the river were designed to meet dissolved oxygen levels based upon 3,000 c.f.s flow over the Troy lock dam. Any reduction of flow below this level may adversely impact the plants.

Very truly yours,

Fred J. Wurtemberger

Fred J. Wurtemberger, P.E.

FJW:emc
Attachment

MAR 21 '84

	TCA	TCD	RAA	
	JGM		FO	
	HVL		WPO	
	TL		SO	
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CrownZellerbach

March 19, 1984

Mr. John B. Mulligan, P.E.
Malcolm Pirnie, Inc.
11 Computer Drive West
Albany, New York 12205

Dear Mr. Mulligan,

Enclosed please find the completed inventory form requested in your letter of March 15, 1984.

* We see no problems associated with reducing the Hudson River flow; however, the use of water is absolutely necessary in order for us to operate the mill. It is imperative that the head be maintained at the dam above the Route 9 bridge, and that we are able to draw our maximum allowable flow of 15 cfs.

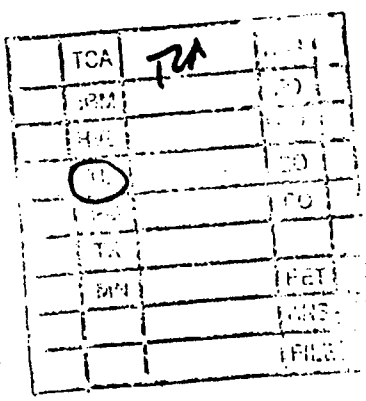
If you have any questions, please call.

Very turly yours,

David W. Healt
Technical Supervisor

DWH/mh
c.c. C.A. Warren
L.A. Broeren
J.G. Koller
R. Crawford
J.G. Coma
F.P. Wightman
R.W. Pearson
J.C. Butler

MR23'84



One River Street, So. Glens Falls NY 12801

phelps dodge
Cable & Wire Company P.O. Box 391, Yonkers, New York 10702 • (914) 963-8200

March 20, 1984

Malcolm Pirnie, Inc.
11 Computer Drive West
Albany, NY 12205

Att: John B. Mulligan, P.E.
Project Manager

Gentlemen:

I have reviewed the information in your correspondence of March 15, 1984 and it appears "O. K.", except that discharge is basically non-contact cooling water instead of sanitary.

Restricting flow of the Hudson River would force us to lower the intake pipe for our auxiliary sprinkler system water which is taken from the river, if needed. This would be only a minor item and may not even be necessary depending on the amount the tide line is lowered.

Very truly yours,

PHELPS DODGE CABLE & WIRE CO.

Leonard J. Barringer

LJB:hds

MAR 23 '84

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GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY . . . . NORYL AVENUE, SELKIRK, NEW YORK 12158
Phone (518) 439-9371

PLASTICS
BUSINESS
OPERATIONS

NORYL PRODUCTS DIVISION

KR27'84

March 23, 1984

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MR	

Mr. John Mulligan
Malcolm Pirnie, Inc.
11 Computer Drive West
Albany, New York 12205

Dear Mr. Mulligan:

I have reviewed the table showing permit conditions and actual performance of Selkirk's Waste Water Treatment Plant sent by you on March 15, 1984, and have the following comments:

- Based on 1983 data, the actual average flow rate is 0.82 mgd and average copper value is 2.6 lbs. per day.

- Outfall 002 has never been used.

The reduction of flow in the Hudson during the summer months should not have any impact on operations at this site.

Please call me if you require additional information.

Sincerely,

Thomas C. Wrobleski

Tom Wrobleski
Environmental Specialist

TCW/cn

cc: J. M. Joyce

INTERNATIONAL PAPER COMPANY
CORINTH, NEW YORK 12822
PHONE (518) 654-9031

March 26, 1984

Malcolm Pirnie, Inc.
11 Computer Drive West
Albany, New York 12205

Gentlemen:

Your letter dated March 15, 1984 concerning the potential impacts of reducing flows in the Hudson River during the summer months has been received and reviewed. The information contained on the inventory forms for industrial water supplies and industrial wastewater discharges for our facility appears to be correct.

It is not possible at the present time to comment with certainty what effect a reduction in flow would have on the Hudson River Mill. The overall effect, of course, would depend on the actual volume of water remaining in the river and how the water is released. One problem which can be foreseen with a fair degree of certainty involves our Waste Treatment Plant. Currently, it is standard practice to have to add river water to the Waste Treatment Plant intake for several weeks during the summer in order to cool the effluent down so that the plant can meet its thermal discharge limit of 100°F. If the flow in the river is reduced, the water temperature will increase, and our Waste Treatment Plant may not be able to meet its thermal discharge limit; or so much cooling water will be needed that the plant will be hydraulically overloaded. In either case, the end result will be non-compliance with our environmental discharge permit.

If you have any further questions, please feel free to call me at 654-9031, ext. 511.

Sincerely,

Larry Burch

LARRY BURCH
Supv. - Technical and
Environmental Services

/js

cc: JA McKenney; KL Goodwin; RW Whitehead

The Town of East Greenbush

RENSSELAER COUNTY—EAST GREENBUSH, N.Y. 12061

Department of Public Works—Phone 477-6103

MAR 30 '84

March 28, 1984

	TCA	RA &
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	TR	
	MN	RET
		ANS
		FILE

Mr. John B. Mulligan, P.E.
Malcolm Pirnie, Inc.
11 Computer Dr. West
Albany, New York 12205

Dear Mr. Mulligan:

In answer to your letter dated March 13, 1984, the data which was enclosed with regard to our Treatment Facility is basically correct. The only comment I find necessary to make is on the maximum flow in the actual column. The value is probably higher. Due to heavy flows at certain times of the year one of our flowmeters was pegged out at 2.0 m.g.d. We assume that channel saw more flow than it actually recorded. We also have to by-pass a portion of our flow during such high flows. There is no flow meter on the by-pass line. We have no way of estimating this flow.

As far as a reduction of Hudson River flows are concerned, unless S.P.D.E.S. permit conditions change or become more stringent, in terms of our effluent discharge parameters, there should be no adverse affects on our facility.

Sincerely,

Terence G. Sharp

Terence G. Sharp
Chief Operator
East Greenbush Pollution
Control Facility

TS/ke

APR 2 - '84

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Tagsons Papers

Tagsons Papers, Inc.
P.O. Box 1989
99 Broadway
Albany, New York 12201
518/462-0200

March 30, 1984

Malcolm Pirnie, Inc.
11 Computer Drive West
Albany, New York 12205

ATTN: Mr. John B. Mulligan, P. E.

SUBJ: Possible Reduction of Flow in the Hudson River

REF: Your Letter to G. Neil Willestoft dated 3-16-84

Dear Mr. Mulligan:

We have reviewed your letter of 3-16-84 with the Engineering Firm of Clough, Harbour & Associates. I am enclosing a copy of letter from Mr. Joseph J. Bianchine indicating the flow must be maintained at a level high enough to provide sufficient water to our Plant intake line. Failure to do so would result in a total shutdown of our Mechanicville Plant and Menands Converting Facility.

The information is correct on the attached inventory data form you sent us.

Very truly yours,

TAGSONS PAPERS, INC.

G. Neil Willestoft

G. Neil Willestoft
Vice President - Manufacturing

GNW:kac

Enclosure

c.c. Thomas A. Galante II

CLOUGH, HARBOUR
& ASSOCIATES
ENGINEERS & PLANNERS

• ALBANY, NEW YORK • HOBOKEN, NEW JERSEY •

PARTNERS

RONALD J. CLOUGH, P.E.
WILLIAM A. HARBOUR, P.E.
JOSEPH J. BIANCHINE, P.E.
RICHARD B. BOVEE, P.E.
RICHARD R. PIKUL, P.E., DR. ENG.

ASSOCIATES

THOMAS L. HESNOR, P.E.
PERCY B. COTTON, P.E.

ALBANY OFFICE
24 AVIATION ROAD
P.O. Box 1269
ALBANY, NEW YORK 12205
518-458-7735

DIRECTOR OF PROJECT DEVELOPMENT
RAYMOND J. KINLEY, JR.

March 28, 1984

Mr. Neil Willestoft
Vice President of Marketing
TAGSONS Papers, Inc.
P.O. Box 1980
Albany, New York 12201

Dear Neil:

In reviewing your letter of March 19th, I retrieved from our files information on the water intake structure to the plant. The invert of the structure is set at U.S.G.S. Elevation 40.5± with an opening height of 5 feet. Therefore, in order to maintain water to the plant, the River Elevation should not be allowed to drop below U.S.G.S. Elevation 45.5 at the intake.

Should you need any further information, please do not hesitate to contact me.

Very truly yours,

CLOUGH, HARBOUR & ASSOCIATES
ENGINEERS & PLANNERS

Joseph J. Bianchine, P.E.
Partner

JJB:vnh

CC: T.A. Galante, II

File: 771

American Water Works Association MEMBER

TOW OF QUEENSBURY WATER DEPARTMENT

R.D. 2 CORINTH ROAD • QUEENSBURY, NEW YORK 12801 • PHONE 793-8866

THOMAS K. FLAHERTY, C.E.T.
Superintendent

RALPH VAN DUSEN
Chief Operator-Laboratory Director

MAR 30 '84

March 28, 1984

	TCA		RA
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Mr. John B. Mulligan, P.E.
Project Manager
Malcolm Pirnie Engineers
11 Computer Drive West
Albany, New York 12205

Re: Hudson River - Black River Regulating District
Letter MP - 3/13/84

Dear Mr. Mulligan:

Please be advised that the Town of Queensbury presently operates a municipal potable water treatment plant utilizing the Hudson River as a source.

Our plant piping, chemical feed equipment pumps and intakes are designed for fifteen million gallon per day (15MGD).

Our present production is limited to five millon gallons per day (5MGD) by our filtering capacity. The filtering capacity can be increased in increments of five million gallons (5MG).

This plant presently serves a population of fourteen thousand (14,000) and is designed in accordance with a New York State Health Department concept to serve as a regional plant.

Our current daily production is 1.6 MGD.

I would be most concerned about the impact upon our intake facilities or any significant reduction in river flow. It is my feeling that reduction of river flow to increase recreational property value is not in the interest of the public in general, certainly not in the interest of the Queensbury Water System.

Very truly yours,

T.K. Flaherty

TKF:cf

Thomas K. Flaherty, C.E.T.
Water Superintendent

Medical Center Castle Point NY 12511

Veterans Administration

APR 0 1 '84

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In Reply Refer To: 533/138

April 5, 1984

Mr. John B. Mulligan, P.E.
Malcolm Pirnie, Inc.
11 Computer Drive West
Albany, New York 12205

Dear Mr. Mulligan:

Your letter dated March 13, 1984, regarding the reduction of flows in the Hudson River during the months of May to September shall impact severely on our Medical Center Water Supply System. At the present water levels, chlorides enter our water system every August and remain at levels of 200 parts per million to 1000 ppm for three to four months before subsiding. One year during the drought, chlorides were present in the river until February. Essentially, if the levels are lowered during the proposed months; our chloride season would start in May and last until December each year.

Our greatest concern is the adverse affect of chlorides on our patients on low salt diets.

Our current practice is to blend the well water with the river water to control the chlorides at a level of 100 ppm. However, the hard well water and the chlorides affect the operation of our domestic hot water heat exchangers and our boilers. The fouling of the tubes results in high maintenance and operating costs.

We are currently constructing a new 0.15 mgd Water Treatment Plant, and a small Reverse Osmosis Unit is to be installed, but it shall only be used if our well water system fails during the chloride season.

Unless this facility could be guaranteed a separate water system, possibly through the New York City - Catskill Water Supply System, we recommend that the Hudson River flow not be reduced during the months of May to September.

If you have any questions, your contact number here is 914-831-2000, extension 5138.

Yours very truly,

Joseph Kajor

JOSEPH KAJOR, P.E.
Chief, Engineering Service

CENTRAL HUDSON
GAS & ELECTRIC CORPORATION

284 SOUTH AVENUE, POUGHKEEPSIE, N. Y. 12601

(914) 452-2000

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April 17, 1984

John B. Mulligan, P.E.
Project Manager
Malcolm Pirnie, Inc.
11 Computer Drive West
Albany, NY 12205

Dear Mr. Mulligan:

As per your request dated March 15, 1984, enclosed please find revised inventory fact sheets for Central Hudson Gas & Electric Corporation's Roseton and Danskammer Point Generating Stations. The updated inventory fact sheets were based on data compiled from January 1, 1983 - December 31, 1983.

Based on the information we have at this time, it does not appear that any reductions of flow from the Sacadanga Reservoir will result in any impacts on the operation of our facilities.

If you should have any further questions, please contact the undersigned.

Very truly yours,

Marty Daley

Martin W. Daley
Environmental Affairs

MWD/jsc
Enclosure

ORANGE AND ROCKLAND UTILITIES, INC.
one blue hill plaza, pearl river, new york 10965

MAY 3 - '84

FRANK E. FISCHER
Vice President
914-627-2420

	TCA		RAA
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			FILE

April 20, 1984

Mr. John B. Mulligan
Malcolm Pirnie, Inc.
11 Computer Drive West
Albany, New York 12205

Dear Mr. Mulligan:

This letter is in response to your inquiries of March 15, 1984 to me and Mr. Frank J. Kiernan regarding our power plant discharges to the Hudson River from the Bowline Point and Lovett Generating Stations.

A list of comments to your inventory forms for these stations is enclosed. With regard to your hypothesis of reducing river flows, we are generally of the opinion that water reduction in the Hudson River will have no impact on cooling water operation, since tidal flow greatly predominates in the portion of the river where the plants are located. Reduction of fresh water flow, however, would elevate salinity levels in the lower Hudson, whose impact may need to be addressed.

If we can be of further assistance, please do not hesitate to contact us.

Very truly yours,

Frank E. Fischer

FEF:mr

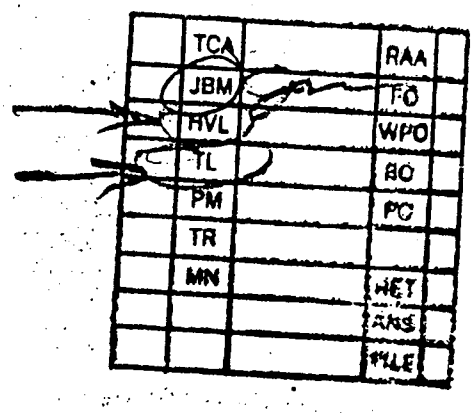
Enc.

cc: F. J. Kiernan

Mercer Companies Inc.

330 Broadway
Albany, New York 12207
Telephone 518/434-1311

APR 26 '84



April 24, 1984

Malcolm Pirnie, Inc.
Engineers and Consultants
11 Computer Drive West
Albany, New York 12250

Attn: John B. Mulligan, P.E.
Project Manager

Dear Mr. Mulligan:

Fort Miller Associates is currently involved in the construction of a 4800 KW hydroelectric generating facility on the Hudson River at the Fort Miller Dam in Saratoga and Washington Counties, New York.

We are writing in response to your recent letter wherein you indicate that you are currently conducting a study to determine the potential impacts of reducing flows in the Hudson River during summer months.

We are extremely concerned by the prospect of summer month flow reductions. Our design capacity is based on historic flow regimes and any deviation therefrom could result in an economic disaster for our company.

As you may know, small hydroelectric projects are very capital intensive. Any significant change in flow would have a tremendous impact on our production. Because of the fact that our power sales rate is set by Niagara Mohawk, a decrease in production would result in financial disaster.

We are somewhat concerned by the fact that your current study includes only industrial and municipal water users and, it does not specifically include all of the hydroelectric producers along the river. We would hope that you would contact all of the respective hydroelectric producers on the river to fully access the economic impact of the proposed flow reduction prior to submitting your report to the Regulating District.

If I may provide any additional information, please do not hesitate to contact me.

Very truly yours,

Fort Miller Associates

BY: F. Michael Tucker

F. Michael Tucker

FMT/kff

Fort Miller Pulp and Paper Company

Fort Miller, N. Y.

MAY 3 - '84

April 30, 1984

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			FILE

Malcolm Pirnie, Inc.
Engineer's and Consultants
11 Computer Drive West
Albany, New York 12250

Attn: John B. Mulligan, P.E.
Project Manager

Dear Mr. Mulligan:

We are writing with regard to the study you are currently conducting for the Hudson River-Black River Regulating District, to determine the potential impacts of reducing flows in the Hudson River during summer months.

Fort Miller Pulp and Paper Company recently finalized plans to expand its facilities to accomodate a new product line. The process water requirements in connection with our expansion will significantly increase our dependence on the Hudson River for industrial water supplies. At the present time our engineers estimate that we will require four million gallons per day.

Any restriction on our legal right to enjoy the beneficial use of our riparian water rights will result in extreme economic hardship to our company and the community it employs. Furthermore, such action would necessitate that we commence legal action to protect our legal property interest in the flows of the Hudson River.

In connection with your inventory, we should like to point out, that the 1982-1983 data for our existing facility is inaccurate. Please be advised that our current design capacity for industrial water supply is 5 million gallons per day.

Thank you very much for this opportunity to participate in your study. If you have any additional questions, please feel free to contact me.

Very truly yours,

Ronald G. Harrington

Ronald G. Harrington

RGH/kff

NOTES TO APPENDIX I

1. Column A indicates weekly average historical flow in Hudson River above Hadley.

2. Column B indicates weekly historical reservoir discharges and is included for comparison purposes.

3. Column A plus B indicates weekly average historical flow in Hudson River at Spier Falls and is included for comparison purposes.

4. Column D indicates weekly average historical reservoir inflow.

5. Column A plus D indicates simulated flow at Spier Falls based on historical flow in Hudson River above Hadley and historical reservoir inflow.

6. Storage change is additional flow required to achieve target flow. If Column A plus D is greater than the target flow then the storage change = 0.

7. Elevation change corresponds to storage change. For example, an average weekly storage change of about 820 cfs, or 0.5 billion gallons, corresponds to an elevation change of 0.5 feet.

8. Reservoir elevation is assumed to be at Elevation 768 by week 16. In actuality, it usually occurs sometime after this period. Therefore, the reservoir may still be refilling and the actual flow less than that indicated.

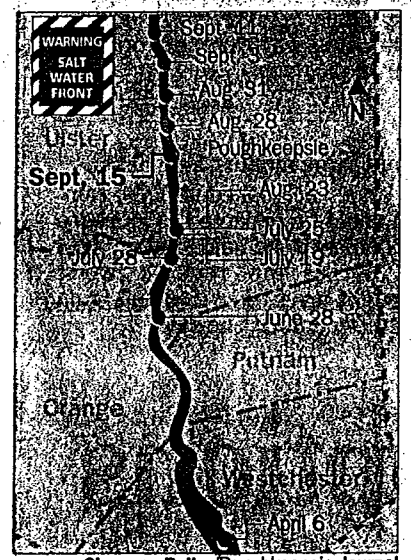
9. Storage represents the volume of water above Elevation 762.

10. Actual flow equals the natural flow (A plus D) when (A plus D) is greater than the target flow prior to initial decreases in storage change. Actual flow equals the target flow if (A plus D) is less than the target flow.

11. Target flow is that flow which will limit drawdown to Elevation 762 by September 30th given prior knowledge of future reservoir inflows and Hudson River flows above Hadley. This is the theoretical maximum sustained flow which could have been achieved at Spier Falls under a 6 foot drawdown constraint.

Poughkeep

SATURDAY, SEPTEMBER 16, 1995 SINCE 1785 ■ NEW YORK S



Clarence Pullar/Poughkeepsie Journal

Town, city

Releases push salt front southward

By Dennis Kipp
Poughkeepsie Journal

Responding to mounting pressure from state and county health officials, the city and town of Poughkeepsie Friday called for voluntary water conservation by the 75,000 residents of the two communities.

Poughkeepsie Mayor Sheila Newman said she would like to see water consumption in the two communities drop by between 500,000 and 1 million gallons a day. The city and town, which share a water system, use about 10 million gallons a day.

"Both the city and town are asking for voluntary water conservation, the emphasis on conservation," Newman said at a Friday afternoon press conference. Representing the town at the press conference was Councilman Patrick Hinkley, a member of the town's water committee.

The announcement followed a Friday morning meeting of Dutchess County Department of Health officials with city and town of Poughkeepsie officials.

"We generally talked to them about water conservation," said David Ruff, director of environmental health services for the county department.

Earlier in the week, Poughkeepsie City Manager Michael Murphy said there was no need to ask city residents to conserve water because increased fresh water releases from Great Sacandaga Lake in the Adirondack Park had stopped the northward movement of the Hudson River's salt front and improved the quality of river water entering the city system.

At Friday's press conference, Murphy said there were ample supplies of water and that there was no

Please see **Water,** 2A

Over

sie Journal

STATE'S OLDEST NEWSPAPER 50 CENTS

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Water: Volunta

Continued

need for conservation to be a hardship. "These are practical things we ought to be doing all the time anyway," he said.

Friday's announcement came as the U.S. Geological Survey reported that the Sacandaga water releases were slowly pushing the salt front south, although the Poughkeepsie water treatment plant continues to draw salty water from the river during high tides.

Ruff said his office was preparing letters to send to supervisors and mayors throughout the county urging them to institute voluntary water conservation measures, if they have not do so already. He said the call for conservation applies to all 220 community water systems in the county.

The U.S. Geological Survey reported Friday that continuing releases from Sacandaga were showing success in pushing the river's salt front south, helping to reduce the salinity of water pumped from the river by the City of Poughkeepsie water treatment plant.

Gary Firda, a hydrologist with the Troy-based agency, said the river's salt front — dividing line between salty ocean water on the south and fresh water on the north — was 0.9 mile north of the city's water intake at high tide Friday.

Since the Sacandaga releases began Sept. 5, the salt front at high tide has moved 3.5 miles south, according to U.S. Geological Survey measurements. Firda said some of the southward movement seen Friday was probably due, in part, to winds out of the northwest.

Firda said it would be several more days before the Sacandaga releases — amounting to 2,000 cubic feet of water per second — would push the salt front south of the Poughkeepsie water intake at high tide.

He said that to replace all the water in a five-mile stretch of the Hudson at Poughkeepsie would require releases of 2,000 cubic feet per second for 20 days — about 259 billion gallons.

Unless there is significant rain to replenish Sacandaga, the releases can continue only for about three months, said Firda.

Under normal conditions, rainfall could be expected to increase next month, he said. But in 1964 — during the region's worst drought ever — "it didn't rain until December," he said.

ary curbs urged

Conservation practices save water

The Dutchess County Department of Health Friday released these conservation suggestions:

- Limit lawn watering; water during cool periods to decrease evaporation; make sure the water lands only on the lawn, not pavement.
- Limit car washing.
- Turn off water when not using it. Don't let it run while you shave, brush your teeth or soap up in the shower.
- Take short showers, not baths.
- Don't flush the toilet as often. Each flush consumes 5 to 7 gallons.
- Run full loads in the dishwasher and washing machines.
- Check faucets, pipes and toilets for leaks. Even the smallest leak can waste 20 gallons a day.
- Sweep sidewalks and driveways, instead of hosing them off.
- Businesses and governments can refrain from hosing outdoor areas and can turn off ornamental fountains.

Mon
MONDAY
SEPTEMBER 4, 1995

THE DAIL
The Independent V

Sacandaga to drop

By JON BLACKWELL
Gazette Reporter

MAYFIELD — The Great Sacandaga Lake will drop by a foot beginning Tuesday in an attempt to flush a "salt front" creeping up the Hudson River toward municipal water supplies.

Doubling the freshwater release from the reservoir is described as an unprecedented step. But it's a worthwhile experiment after a summer that has dried many of the Hudson's tributaries, regulatory officials said Sunday.

Businesses that depend on lake tourism and were already hard-hit by dropping lake levels throughout the summer were stunned and angered by the plan.

The state Department of Environmental Conservation and Hudson River-Black River Regulatory District decided on the water release Friday, but some on the lake's shore learned of it second-hand.

"In instances where they're going to decrease the lake level rapidly, the commercial places should be notified," said Wes Muddle, owner of Holly's Marina in Mayfield.

"There are hundreds of boats worth millions of dollars on this lake, and without notice, their owners could return in four days to find them in the mud."

Thomas Brewer, chief engineer for

Y GAZETTE
oice of the Capital Region

50 CENTS
SCHENECTADY, N.Y.

1 foot in river flush

the district, said his agency's mission is to augment the flow of the Hudson, not look after the lake shore.

"They don't need to be told about it at all," Brewer said. "It's for the river."

Brewer said the water release will increase from 850 cubic feet, or 6,358 gallons, per second to 2,000 cubic feet, or 14,960 gallons, per second.

While dramatic, the increase would bring the river flow in line closer to last year's figures of 2,500 cubic feet per second at the same time, Brewer said.

The state Department of Health had requested that the DEC and the regulatory district take action to lower the salt front, the dividing line between fresh water flowing south and salty ocean water advancing north.

According to the U.S. Geological Survey, that front had moved last week to 2.5 miles north of the water intake point for Poughkeepsie city water — its highest level since 1964.

High levels of salt in drinking water may threaten the health of some people, but the average consumer wouldn't notice or be affected, said Warren Lavery, director of the DEC's Bureau of Water Resources.

The salt front is the point at which the chloride level in water is 100 milligrams per liter, Lavery said. By contrast, the level considered safe by

See SHORE, Page A8

Ex "I"

Shore residents angered

Continued from Page A1

the federal government is 250 mg; in the ocean, the level averages 27,000 mg.

John Glass, an engineer with the Dutchess County Department of Health, said it will take several days for increased freshwater flows to reach Poughkeepsie.

But both Brewer and Lavery acknowledged they have no way of knowing whether the plan will work.

"The idea here is to try something and see what happens," Brewer said.

Lavery said the release will last 10 days, lowering the level of Great Sacandaga Lake by 12 to 14 inches. It's now at 756 feet above sea level, 2 feet below the average over its 65-year history, said Northampton Beach supervisor Brad Buyce.

Edinburg Town Supervisor Jean Raymond said she was relieved to learn the lake would drop 1 foot, not 5 to 6 feet as had been rumored. But she chastised the district for not warning boaters, businesses and elected officials about its plans, which would have been the "good-government" approach.

"How do you do something like this that will have a large impact on a large number of people when you don't even know if it has a good chance of working?" she said. "It's like dropping a bomb to see if it explodes."

Lavery, who helped draw up the plans last week, said he was unaware they were being implemented Tuesday. He said he expected the increased release to begin next week at the latest.

Randy Gardinier, chairman of the Great Sacandaga Lake Fisheries Federation, attacked the district for what he called mismanagement of the reservoir.

Earlier in the summer, more than 3,000 local residents signed a petition to Gov. George Pataki calling for the district to disband.

Too much water was released in early January, when the district should have known that low snowfall would lead to low spring runoff, Gardinier said.

Brewer said he and district engineers had no way of predicting spring weather months in advance.

Gardinier said the steady fall-off of reservoir levels has left the edges of the lake shallower and muddier than need be, he said. Some fish have been left behind in isolated pools to die, he said.

"They're justified in doing it [increasing the water release]," Gardinier said. "But it could have been done in a better way. People are rightfully upset."

The Associated Press contributed to this report.

STATE OF NEW YORK

Board of Hudson River-Black River Regulating District
350 Northern Boulevard, Albany, New York 12204 Phone (518) 465-3491
FAX (518) 432-2485

April 8, 2010

Honorable William Peck, Chairman
Saratoga County Board of Supervisors
40 McMaster Street
Ballston Spa, New York 12020

Re: Hudson River – Black River Regulating District
Apportionment

Dear Chairman Peck:

The Hudson River – Black River Regulating District Board adopted the Apportionment for the Hudson River Area with Modification subsequent to conducting the Apportionment Hearing Grievance at its March 30, 2010 Board meeting. Following approval by the Department of Environmental Conservation, and as required by NY ECL §15-2121(5), on behalf of the Regulating District Board, please find a copy of the Apportionment for the Regulating District's fiscal year July 2009 – June 2010 served upon you as Chairman of the Rensselaer County Legislature. As required by statute, a copy of the Apportionment will also be filed in the Office of the County Clerk. Remittance is due upon receipt, but no later than June 30, 2010.

Also enclosed, please find a copy of the Resolution through which the Regulating District adopted the Apportionment for the Hudson River Area with Modification and the letter from Commissioner Grannis through which the Department of Environmental Conservation approved the Apportionment.

Please feel free to contact me if you have any questions. Thank you.

Sincerely,

Glenn A. LaFave/asf
Glenn A. LaFave
Executive Director

cc: David A. Wickerham, Saratoga County Administrator
Mark M. Rider, Saratoga County Attorney
Kathleen A. Marchione, Saratoga County Clerk

State of New York

Hudson River – Black River Regulating District

Great Sacandaga Lake

Operation and Maintenance Cost

and

Apportionment of Operation and Maintenance Cost

Approved by
BOARD OF HUDSON RIVER – BLACK RIVER REGULATING DISTRICT
March 30, 2010

Certified to
Department of Environmental Conservation
March 30, 2010

APPORTIONMENT OF OPERATION AND MAINTENANCE COST OF THE GREAT SACANDAGA LAKE RESERVOIR PREFIXED TO A RESOLUTION ADOPTED BY THE BOARD OF HUDSON RIVER – BLACK RIVER REGULATING DISTRICT March 30, 2010.

ID No.	NAME OF PUBLIC CORPORATION	PROPORTION OF COST	AMOUNT TO BE PAID
1	County of Albany	0.392563628	$ 1,748,166.66
2	County of Rensselaer	0.215951341	$ 961,675.78
3	County of Saratoga	0.285389349	$ 1,270,897.53
4	County of Warren	0.066742217	$ 297,216.83
5	County of Washington	0.039353465	$ 175,249.08

10-11-03

RESOLUTION TO APPROVE THE APPORTIONMENT FOR THE HUDSON RIVER AREA WITH MODIFICATION

WHEREAS, the Regulating District Board, served a copy of such apportionment as provided at NY ECL §15-2121, noticing and publishing the time and place at which the Board will meet to hear any public corporation or person aggrieved by the Board's apportionment determination; and

WHEREAS, the Board of the Hudson River-Black River Regulating District has determined the total cost to operate and maintain the Regulating District's Hudson River Area facilities (Great Sacandaga Lake, formerly Sacandaga Reservoir); and

WHEREAS, NY ECL §15-2121(2) and §15-2125(2) require the Regulating District Board to apportion such cost, less the amount chargeable to the state, among the public corporations and parcels of real estate benefited, in proportion to the amount of benefit which shall inure to each such public corporation and parcel of real estate by reason of such reservoir; and

WHEREAS, the United States Court of Appeals, DC Circuit determined that the Federal Power Act preempts the Regulating District's use of state law to collect the Regulating District's annual costs of operations and maintenance from the federally licensed hydropower companies operating within the Hudson River Area; and

WHEREAS, the Regulating District Board has determined that by grouping the towns, cities, villages and the individual parcels of real estate within each such public corporation, the potential for disparate treatment of one individual parcel, neighborhood or municipality when compared to others diminishes; and

WHEREAS, the Regulating District Board has determined that the Regulating District provides a negligible annual benefit to the state by diverting flow to the NYS Champlain Canal and the state has not required that a reasonable return to the state be included in the costs to be apportioned; and

WHEREAS, the attached written apportionment shows the name of each public corporation benefited and the proportion of such cost less the amount chargeable to the state to be borne by each, expressed in decimals and the amount to be paid by each such public corporation; and

WHEREAS, the amount to be paid by each such public corporation is determined by multiplying the total cost less the amount which may be chargeable to the state by the decimal representing the proportion thereof to be borne by each public corporation; and

WHEREAS, the Regulating District Board, or a majority of its members, have viewed the public corporations benefited; and

WHEREAS, NY ECL §15-2121 requires that the Regulating District Board shall, upon its approval of the apportionment, certify such apportionment to the Department of Environmental Conservation for approval; and

10-11-03

WHEREAS, following such apportionment grievance hearing, such apportionment if not modified shall become final and conclusive; or if modified, following approval of the modified apportionment by the Department of Environmental Conservation, such apportionment as so modified shall become final and conclusive; and

WHEREAS, the Board of the Hudson River-Black River Regulating District, at the January 12, 2010 Board meeting, adopted the "State of New York Hudson River-Black River Regulating District Great Sacandaga Lake Operation and Maintenance Cost and Apportionment of Operation and Maintenance Cost" apportionment for the Regulating District's Hudson River Area facilities; and

WHEREAS, on January 12, 2010, the Board certified the Apportionment to the Department of Environmental Conservation for its approval; and

WHEREAS, by letter dated February 3, 2010, the Department Commissioner approved the Apportionment; and

WHEREAS, the Board having heard those aggrieved by the Board's apportionment determination at an apportionment grievance hearing held March 30, 2010; and

NOW THEREFORE BE IT RESOLVED, the Board of the Hudson River-Black River Regulating District does hereby adopt the "State of New York Hudson River-Black River Regulating District Great Sacandaga Lake Operation and Maintenance Cost and Apportionment of Operation and Maintenance Cost" apportionment for the Regulating District's Hudson River Area facilities with modification; and

BE IT FURTHER RESOLVED, pursuant to NY ECL §15-2121, the Board of the Hudson River-Black River Regulating District certifies such apportionment to the Department of Environmental Conservation for its approval; and

BE IT FURTHER RESOLVED, that upon approval by the Department of Environmental Conservation the Board of the Hudson River-Black River Regulating District directs staff to serve the apportionment as required by NY ECL §15-2121; and

BE IT FURTHER RESOLVED, that once approved and served, the Regulating District Board's apportionment is final and conclusive fixing the apportionment and basis of apportionment of all subsequent expenses to be incurred in the maintenance and operation of the Regulating District's Hudson River Area facilities.

Approved as to form:

Robert P. Leslie
General Counsel

Approved at the March 30, 2010 Board Meeting

10-11-03

Motion was made by Ms. Beyor and seconded by Mr. Berkstresser that the Resolution be approved.

Present and Voting:

MEMBER	AYE	NOE	ABSTAIN
Ms. Beyor	X		
Mr. Pintuff			(Excused)
Mr. Bartow	X		
Mr. Berkstresser	X		
Mr. Cornell	X		
Mr. Klein	X		

Approved at the March 30, 2010 Board Meeting

CORPORATE RESOLUTION CERTIFICATION

I HEREBY CERTIFY that the following is a true and correct copy of Resolution 10-11-03 to Approve an Apportionment With Modification for the Hudson River Area duly adopted at a meeting of the Board of Directors of **The Board of Hudson River – Black River Regulating District** a corporation incorporated under the laws of the State of New York duly called and held on the 30th day of March, 2010, a quorum then being present; that the said resolution has been entered upon the regular minute book of the corporation and are in accordance with the certificate of incorporation and the by-laws and are now in full force and effect.

I FURTHER CERTIFY that the names of the persons holding titles referred to in the foregoing resolutions are as follows:

NAME	TITLE
Pamela Beyor	First Vice Chairperson
Philip Klein	Chairperson
John Bartow	Board Member
David Berkstresser	Board Member
Paul Cornell	Board Member

(Corporate Seal)

Treasurer: Richard J. Fahey

Date: 3/31/10

DAVID A. PATERSON
GOVERNOR

ALEXANDER B. GRANNIS
COMMISSIONER

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK 12233-1010

APR 0 2 2010

Mr. Glen A. LaFave
Executive Director
Hudson River-Black River Regulating District
737 Bunker Hill Road
Mayfield, New York 12117

Dear Mr. LaFave:

The Department of Environmental Conservation has received the Hudson River-Black River Regulating District's (District) March 30, 2010 State of New York Hudson River-Black River Regulating District Great Sacandaga Lake Operation and Maintenance Cost and Apportionment of Operation and Maintenance Cost (revised apportionment) approved by the District's Board (Board) on March 30, 2010, and certified to DEC on April 1, 2010. Environmental Conservation Law (ECL) §15-2121 provides that the Board shall prepare an apportionment, certified to DEC for its approval, to recover the District's total cost and operation and maintenance expense from the public corporations and parcels of real estate benefitted by the Great Sacandaga Lake (Reservoir) in proportion to the amount of the benefit which will inure to each by reason of such Reservoir.

In reviewing the revised apportionment, DEC has relied on the expertise of District staff who prepared the revised apportionment in identification of: (1) the most direct and clearly defined benefit derived by operation of the Reservoir, i.e. flood protection; (2) the beneficiaries which receive the flood protection benefit; and (3) the method to determine the proportion of the flood protection benefit which will inure to each beneficiary. As the revised apportionment is not inconsistent with the provisions of ECL §15-2121 and ECL §15-2125, I hereby approve said revised apportionment as required by ECL §15-2121(4).

Sincerely,

Alexander B. Grannis

40 years of stewardship 1970-2010