OFFICE OF THE SUPERVISOR

Telephone (914) 277-3637 Fax (914) 276-0082 Town of Somers

WESTCHESTER COUNTY, N.Y.

SOMERS TOWN HOUSE 335 ROUTE 202 SOMERS, NY 10589

RICK MORRISSEY SUPERVISOR



SOMERS TOWN BOARD WORK SESSION 7:00PM THURSDAY, MAY 6, 2021

www.somersny.com

6:15PM - Executive Session

- A. PLEDGE OF ALLEGIANCE:
- B. PUBLIC HEARING:

PUBLIC COMMENT

Please limit your comments to no more than 3 minutes.

C. TOWN BOARD:

- 1. Town of Somers Covid-19 Update
- 2. Starbucks Black Diamond Presentation
- 3. Tax Certiorari Settlement Discussion
- 4. Name of Private Road in Primrose Commons Discussion
- 5. Warren Street Speed Data Chief Driscoll

SOMERS TOWN BOARD WORK SESSION 7:00PM THURSDAY, MAY 6, 2021

www.somersny.com

- 6. Authorize the Supervisor to execute the following:
 - a. The Renewal of Cable Television ("CATV") Franchise Agreement between the Town of Somers and Comcast for ten (10) years from the Effective Date unless the Franchise is earlier revoked as provided herein.
 - b. The Proposal for Professional Services and Planning Department Support from Woodard & Curran and David B. Smith, Principal of Planning & Development Advisors for a fee of \$10,000 per month for the period of May 1, 2021 through December 31, 2021.
 - c. The Affordable Care Act (ACA) consulting agreement between the Town of Somers and Corporate Plans, Inc. doing business as CPI-HR for a fee of \$8,100 per year effective March 1, 2021 until February 28, 2023.
- 7. Refer request for one way signage on Robert Martin Blvd. to the Somers Police Department, Highway, and Engineering for evaluation.
- D. PARKS & RECREATION: No additional business.
- E. FINANCIAL: No additional business.
- F. HIGHWAY: No additional business.

G. PERSONNEL:

- 1. Current Vacancies:
 - a. Affordable Housing Board (1- 2-year term ending 7/11/2021.)
 - b. Assessment Board of Review (1-5-year term ending 9/30/2025.)
 - c. Partners in Prevention (3- 3-year terms ending 12/31/2023.)
 - d. Partners in Prevention (2- 3-year terms ending 12/31/2022.)
- 2. Upcoming Vacancies Terms Expiring in 2021:
 - a. Affordable Housing Board (1-2-year term ending 7/11/2021.)
- 3. Authorize the hiring of Ms. Stephanie Cutaia probationary as a Senior Office Assistant Office Manager full-time, Grade 4a, Step 5 of the CSEA salary schedule at an annual salary of \$56,060.00 per memo dated April 7, 2021 from Thomas J. Tooma Jr., Building Inspector effective April 26, 2021.

SOMERS TOWN BOARD WORK SESSION 7:00PM THURSDAY, MAY 6, 2021

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- 4. Authorize the promotion of Ms. Erica Gentile as a Provisional Nutrition Site Manager at Grade 4, Step 5 of CSEA Contract at an annual salary of \$49,282.00 per memo dated May 3, 2021 from Kim DeLucia, Executive Assistant to the Supervisor effective May 1, 2021.
- 5. Authorize the appointment of Ms. Patricia Nicolosi to the Board of Assessment Review to fill the vacancy of a five-year term ending September 30, 2025.

H. PLANNING & ENGINEERING:

- 1. For review and comment:
 - a. Wetland Application 2021 Hydrilla Management Project

I. POLICE: No additional business.

J. PROPOSED CONSENSUS AGENDA:

- 1. Accept the following Bond per April 15, 2021 memo from Steven Woelfle, Principal Engineering Technician:
 - a. \$500.00 Erosion Control Bond New York American Water Company/Willow's HOA Wetland Permit #2021-12 - TM: 16.16-2-21
- 2. Release the following Maintenance Bond per April 26, 2021 memo from Steven Woelfle, Principal Engineering Technician:
 - a. \$303,200.00 Maintenance Bond #107207541 Somers Realty Subdivision Phase 3, Clayton Blvd, Halstead Street, Hoyt Street, and Columbus Street
- 3. Authorize the Supervisor to execute the:
 - a. The State Transportation Services Contract, for the period of April 1, 2021 through March 31, 2022 per memo dated April 20, 2021 from Barbara Taberer, Nutrition Program Director.
 - b. The IIIB Transportation Services Contract, for the period of January 1, 2021 through December 31, 2021 per memo dated April 20, 2021 from Barbara Taberer, Nutrition Program Director.
- 4. Schedule a Public Hearing for the Opt-out of Adult Use Cannabis Retail Dispensaries for June 10, 2021.

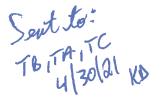
SOMERS TOWN BOARD WORK SESSION 7:00PM THURSDAY, MAY 6, 2021

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2021 Calendar

May 6, 2021	7:00pm	Town Board Work Session
May 13, 2021	7:00pm	Town Board Regular Meeting
		Public Hearing via Remote Access:
		For the out of district water billing
		impacting twelve (12) customers in
		the Amawalk-Heights Water District.
		Public Hearing via Remote Access:
		Proposed Local Law to amend
		Chapter 116 entitled House
		Numbering of Code of the Town of
		Somers changing the title to read
		Building Numbering and Section
		116-5 shall be amended in its
		entirety.
June 3, 2021	7:00pm	Town Board Work Session
June 10, 2021	7:00pm	Town Board Regular Meeting
Julie 10, 2021	7.00pm	Town Doard Regular Meeting
July 1, 2021	7:00pm	Town Board Work Session
June 8, 2021	7:00pm	Town Board Regular Meeting
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5/5/2021 10:14 AM Z:\Supervisor\kdelucia\TB Agendas\2021\May 6 2021 Work Session.docx



STEPHENS, BARONI, REILLY & LEWIS, LLP

ATTORNEYS AND COUNSELORS AT LAW

NORTHCOURT BUILDING

175 MAIN STREET, SUITE 800

WHITE PLAINS, NY 10601

(914) 761-0300

(914) 683-5185

FAX (914) 761-0995 www.sbrllaw.com NORTHERN WESTCHESTER OFFICE OLD POST ROAD PROFESSIONAL BUILDING CROSS RIVER, NEW YORK 10518

> SERVICE NOT ACCEPTED BY FAX OR EMAIL

April 19, 2021

CONFIDENTIAL

ROLAND A. BARONI, JR. rbaroni@sbrllaw.com

COUNSEL

GERALD D. REILLY greilly sbrllaw.com

JOSEPH P. ERIOLE

STEPHEN R. LEWIS slewis@sbrllaw.com

To: Supervisor Rick Morrissey & Town Board

From: Roland A. Baroni, Jr.

Re: Tax Certiorari Settlement

Subject to your authorization, Teresa Stegner and I have concluded settlement of the subject case on the basis as outlined:

1. <u>Idlewild Met., LLC</u> (1 Van Rensselaer Road)

Assessment Year	Assessed Valuation Reduced From	Assessed Valuation Reduced To	Amount of Reduction
2020	\$69,800.00	\$63,855.00	\$5,945.00

Please consider authorization as follows:

"Authorize the Town's Attorneys to execute a Consent Judgment in the following tax certiorari matter: <u>Idlewild Mgt., LLC v. Town of Somers</u> - Index No. 62651/20."

Roland A. Baroni, Jr.

RABjr/wf

cc: Patricia Kalba, Town Clerk

Teresa Stegner, Assessor



From:

Patricia Kalba

Sent:

Tuesday, April 13, 2021 3:26 PM

To:

Kim DeLucia

Subject:

RE: December 3, 2020 TB Work Session Agenda Item: Renaming Road in Primrose Estates

Attachments:

RE: Road Name Referral; RE: Road Name Referral

Kim,

After some further discussion with the Assessor, there is no objection to the private road name of "Primrose Estates".

Please place this on the matter on next agenda for the Town Board consideration.

Thanks,

Patty

Patricia Kalba, RMC, CMC Town Clerk

Town of Somers 335 Route 202 Somers, New York 10589

914-277-3323 914-277-3960 (fax) pkalba@somersny.com

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From: Kim DeLucia <kdelucia@somersny.com> Sent: Monday, November 30, 2020 12:14 PM

To: Roland Baroni - Stepehens Baroni Reilly Lewis LLP

Patricia Kalba

<pkalba@somersny.com>; Anthony Cirieco <acirieco@somersny.com>; Bill Faulkner <wfaulkner@somersny.com>;

Richard Clinchy <rclinchy@somersny.com>; Rick Morrissey <supervisor@somersny.com>; Tom Garrity

<tgarrity@somersny.com>

Subject: December 3, 2020 TB Work Session Agenda Item: Renaming Road in Primrose Estates

Please see below for discussion and referring out to Fire, Police, Highway, and Engineering during Thursday's meeting.

Thank you,

Kim

Kim DeLucia Executive Assistant to Rick Morrissey, Town Supervisor TOWN OF SOMERS 335 ROUTE 202 SOMERS, NY 10589 Phone: 914-277-3637 Fax: 914-276-0082 WWW.SOMERSNY.COM

From: Christopher Foley <cfoley@foleyllc.com> Sent: Tuesday, November 24, 2020 4:16 PM

To: Kim DeLucia < ikdelucia@somersny.com>; Tammi Savva < tsavva@somersny.com>

Subject: Primrose Estates

Kim and Tammi -

I assisted Frank and Rosemarie DiSiena (owners of property at 126 and 128 Route 139) in a successful subdivision application back in 2018. As part of the final plan, the (private) road into the subdivision came to be designated "Primrose Commons." The DiSienas now want to explore renaming the road "Primrose Estates," to coincide with the name of the development, and I have been advised that the Town Board is the correct entity to consider such a request.

How would go about requesting the Town Board to consider the request?

Christopher P. Foley, Esq. Law Office of Christopher P. Foley, LLC The Katonah Professional Building 51 Bedford Road Katonah, New York 10536-2135 (t) 914.301.5925

- (f) 914.301.5924

Kim DeLucia

From:

Denise Schirmer

Sent:

Tuesday, December 29, 2020 7:03 AM

To:

Patricia Kalba; Mike Driscoll; Steve Woelfle; Teresa Stegner; Nick DeVito

Subject:

RE: Road Name Referral

Hi Patty,

The Bureau of Fire Prevention had no objections to Primrose Estates.

Thank you.

Denise

From: Patricia Kalba <pkalba@somersny.com> Sent: Tuesday, December 15, 2020 2:13 PM

To: Mike Driscoll <mdriscoll@somersny.com>; Steve Woelfle <swoelfle@somersny.com>; Teresa Stegner

<tstegner@somersny.com>; Nick DeVito <ndevito@somersny.com>; Denise Schirmer <dschirmer@somersny.com>

Subject: Road Name Referral

Good afternoon,

I am referring the following:

Frank and Rosemarie DiSiena (owners of property at 126 and 128 Route 139) in a successful subdivision application back in 2018. As part of the final plan, the (private) road into the subdivision came to be designated "Primrose Commons." The DiSienas now want to explore renaming the road "Primrose Estates," to coincide with the name of the development.

Please return comments to me.

Thank you!

Patty

Patricia Kalba, RMC, CMC Town Clerk

Town of Somers 335 Route 202 Somers, New York 10589

914-277-3323 914-277-3960 (fax) pkalba@somersny.com

Kim DeLucia

From: Steve Woelfle

Sent: Tuesday, December 29, 2020 9:18 AM

To: Patricia Kalba

Subject: RE: Road Name Referral

Would recommend the name of the private road to not end in "estates" but something like "Court" "Way " or "Place"

From: Patricia Kalba <pkalba@somersny.com> Sent: Tuesday, December 15, 2020 2:13 PM

To: Mike Driscoll <mdriscoll@somersny.com>; Steve Woelfle <swoelfle@somersny.com>; Teresa Stegner

<tstegner@somersny.com>; Nick DeVito <ndevito@somersny.com>; Denise Schirmer <dschirmer@somersny.com>

Subject: Road Name Referral

Good afternoon,

I am referring the following:

Frank and Rosemarie DiSiena (owners of property at 126 and 128 Route 139) in a successful subdivision application back in 2018. As part of the final plan, the (private) road into the subdivision came to be designated "Primrose Commons." The DiSienas now want to explore renaming the road "Primrose Estates," to coincide with the name of the development.

Please return comments to me.

Thank you!

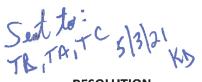
Patty

Patricia Kalba, RMC, CMC Town Clerk

Town of Somers 335 Route 202 Somers, New York 10589

914-277-3323 914-277-3960 (fax) pkalba@somersny.com

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RESOLUTION

To Authorize Supervisor Morrissey to Execute Franchise Renewal Agreement with Comcast

Supervisor Morrissey – Presents the following and moves for its adoption:

WHEREAS the Town desires to renew the cable television franchise agreement with Comcast of New York, LLC ("Comcast"), for the continued operation of a cable system within the Town;

WHEREAS, the Town has reached an agreement with Comcast on the proposed terms of the Franchise Agreement; and copies of the proposed Franchise Agreement were made available for public inspection during normal business hours at Somers Town House, 335 Route 202, Somers, NY 10589.

WHEREAS, on April 8, 2021, the Town Board held a properly noticed public hearing on the proposed agreement, at which public hearing members of the public were afforded a full and fair opportunity to be heard on the adequacy and feasibility of the franchise terms;

NOW THEREFORE BE IT RESOLVED that the Town Board hereby approves the franchise agreement with Comcast for the Heritage Hills Community within the Town of Somers, and authorizes the Supervisor to execute same.

RESOLUTION Offered by: Seconded by:		
ROLL CALL VOTE:	YES	<u>NO</u>
Supervisor Morrissey		
Councilman Garrity, Jr.		
Councilman Cirieco		
Councilman Clinchy		
Councilman Faulkner		





February 25, 2021

Rick Morrissey, Town Supervisor Town of Somers 335 Route 202 Somers, NY 10589

Re: Renewal of Cable Television ("CATV") Franchise Agreement between the Town of Somers and Comcast

Dear Supervisor Morrissey:

As we have discussed, the Federal Communications Commission (FCC) has issued further guidance regarding cable related in-kind contributions contained in cable franchises. The August 2019 FCC 621 Order established that cable related in-kind obligations such as complimentary or reduced cost cable service constitute franchise fees and the fair market value of the services shall count against the maximum 5% franchise fee cap.

This letter shall serve as notice and memorialization of the agreement between the Town and Comcast whereby Comcast will continue to provide complimentary/reduced cost basic cable services to the below listed locations voluntarily and independent of the renewal franchise, but for a period of time consistent with the term of the franchise.

- a) Cable accounts located at 8 Heritage Hills, Somers, NY 10589:
 - 1. Heritage Hills Fitness Building.
 - 2. Heritage Hills Society Office (located within Heritage Hills Activity Center).
 - 3. Heritage Hills Administration Building at Heritage Hills Lake Lodge.
- b) Cable account located at 83 Warren Street, Somers, NY 10589:
 - 1. Heritage Hills Maintenance Building.

Comcast appreciates the opportunity to serve the residents of Heritage Hills and looks forward to continuing to provide our cable services. If you have any questions or concerns relating to this matter, please feel free to contact me at any time. Thank you.

Sincerely,

Matt Skane

Manager, Government & Regulatory Affairs

Western New England Region

11-6

Cable Franchise Agreement by and between the Town of Somers and Comcast of New York, LLC

TABLE OF CONTENTS

ARTI	RTICLE	
1.	DEFINITIONS	4
2.	GRANT OF AUTHORITY; LIMITS AND RESERVATIONS	8
3.	PROVISION OF CABLE SERVICE	10
4.	SYSTEM FACILITIES	12
5	PEG ACCESS CHANNEL(S) AND SUPPORT	13
6.	FRANCISE FEES	14
7.	REPORTS AND RECORDS	15
8.	INSURANCE AND INDEMNIFICATION	16
9.	TRANSFER OF FRANCHISE	18
10.	RENEWAL OF FRANCISE	18
11.	ENFORCEMENT AND TERMINATION OF FRANCISE	19
12.	MISCELLANEOUS PROVISIONS	21
SIGN	ATURE PAGE	25
<u>EXH</u>	IBIT	
EVHI	RIT A _ DESCRIPTION OF PRIMARY SERVICE AREA	26

THIS CABLE FRANCHISE AGREEMENT (the "Franchise" or "Agreement") is entered into by and between the Town of Somers, a validly organized and existing political subdivision of the State of New York (the "Local Franchising Authority" or "LFA", also referenced herein as "Franchising Authority") and Comcast of New York, LLC, (the "Franchisee");

WHEREAS, Franchisee is the duly authorized holder of a Franchise to operate a cable television system in the Town of Somers, said Franchise having commenced on March 8, 2011;

WHEREAS, the LFA wishes to renew Franchisee's nonexclusive franchise to construct, install, maintain, extend and operate a cable system in the Town of Somers;

WHEREAS, the LFA is a "franchising authority" in accordance with Title VI of the Federal Cable Act, (see 47 U.S.C. §522(10)) and is authorized to grant one or more nonexclusive cable franchises pursuant to Article 11 of the New York Public Service Law, as amended, and Title 16, Chapter VIII, Parts 890.60 through 899, of the Official Compilation of Codes, Rules and Regulations of the State of New York, as amended;

WHEREAS, the LFA has identified the future cable-related needs and interests of the LFA and its community, and has determined that Franchisee's plans for the construction, operation and maintenance of its Cable System are adequate and feasible in a full public proceeding affording due process;

WHEREAS, the Franchisee's technical ability, financial conditions and character were considered and approved in a full public proceeding affording due process;

WHEREAS, the LFA has determined that in accordance with the provisions of the Cable Law, this Franchise complies with the franchise standards of the New York State Public Service Commission ("NY PSC") and the renewal of a nonexclusive franchise to Franchisee is consistent with the public interest; and

WHEREAS, the LFA and Franchisee have reached agreement on the terms and conditions set forth herein and the parties have agreed to be bound by those terms and conditions;

WHEREAS, the LFA finds that Franchisee has complied with the terms of its previous franchise;

WHEREAS, Franchisee filed a written request for a renewal of its Franchise by letter dated August 6, 2018 in conformity with the Cable Communications Policy Act of 1984 ("Federal Cable Act");

WHEREAS, there has been an opportunity for public comment, as required by Section 626(h) of the Federal Cable Act and Section 891.2(a) of the rules of the New York State Public Service Commission (at 16 NYCRR Part 891);

NOW, THEREFORE, in consideration of the LFA's renewal of its franchise awarded to Franchisee, Franchisee's promise to provide Cable Service to residents of the Franchise/Service Area of the LFA pursuant to and consistent with the Cable Law (as hereinafter defined), pursuant to the terms and conditions set forth herein, the promises and undertakings herein, and other good and valuable consideration, the receipt and the adequacy of which are hereby acknowledged,

THE SIGNATORIES DO HEREBY AGREE AS FOLLOWS:

1. **DEFINITIONS**

For the purpose of this Renewal Franchise, capitalized terms, phrases, words, and abbreviations shall have the meanings ascribed to them in the Cable Communications Policy Act of 1984, as amended from time to time, 47 U.S.C. §§521 et seq. (the "Cable Act"), and Article 11 of Chapter 48 of the New York Consolidated Laws, as amended from time to time, unless otherwise defined herein. In addition, the following definitions shall apply:

- 1.1. Access Channel: A video channel, which Franchisee may make available without charge for Public, Educational, or Governmental noncommercial use for the transmission of video programming.
- 1.2. Affiliate: Any Person who, directly or indirectly, owns or controls, is owned or controlled by, or is under common ownership or control with, the Franchisee excluding any entity related to the operations of NBC Universal.
- 1.3. *Basic Service*: The lowest tier of service which includes the retransmission of local television broadcast signals.
- 1.4 Cable Act: Cable Communications Policy Act of 1984, Public Law No. 98-549, 98 Stat. 2779 (1984), 47 U.S.C. 521 et seq., amending the Communications Act of 1934, as further amended by the 1992 Cable Consumer Protection and Competition Act, Public Law No. 102-385 and the Telecommunications Act of 1996, Public Law No. 104-458, 110 Stat. 56 (1996) and as may be further amended.
- 1.5. Cable Law: As used herein, the New York State statute and rules governing cable service franchises and service, as described in Article 11 of the new York State Public Service Law, as amended, and Title 16, Chapter VIII, Parts 890.60 through 899, of the Official Compilation of Codes, Rules and Regulations of the State of

New York, as amended, to the extent authorized under and consistent with applicable federal law, including the Cable Act.

- 1.6. Cable Service or Cable Services: Shall be defined herein as it is defined under Section 602 of the Federal Cable Act, 47 USC § 522(6), as amended.
- 1.7. Cable System or System: Shall be defined herein as it is defined under Section 602 of the Federal Cable Act, 47 USC § 522(7), as amended.
- 1.8. *Channel:* Shall be defined herein as it is defined under Section 602 of the Federal Cable Act, 47 U SC § 522(4), as amended.
- 1.9. *Drop*: The coaxial cable that connects a home or building to the feeder cable of the Subscriber Network.
- 1.10. Educational Access Channel: Pursuant to 47 U.S.C. 531, an Access Channel designated for noncommercial use by school districts, other not-for-profit educational institutions chartered or licensed by the New York State Department of Education or Board of Regents, or municipal, county and State government, or agencies thereof.
- 1.11. FCC: The United States Federal Communications Commission, or successor governmental entity thereto.
- 1.12. Force Majeure: An event or events reasonably beyond the ability of Franchisee to anticipate and control. This includes, but is not limited to, severe or unusual weather conditions, strikes, labor disturbances and disputes, war or act of war (whether an actual declaration of war is made or not), insurrection, riots, act of public enemy, incidences of terrorism, acts of vandalism, actions or inactions of any government instrumentality or public utility including condemnation, accidents for which the Franchisee is not primarily responsible, fire, flood, or other acts of God, public health emergencies, or work delays caused by waiting for utility providers to service or monitor utility poles to which Franchisee's network is attached, and unavailability of materials and/or qualified labor to perform the work necessary.
- 1.13. Franchise Area: The incorporated area (entire existing territorial limits) of the LFA, and such additional areas as may be annexed or acquired, including the community of Heritage Hills, located in the Town of Somers, New York.
- 1.14. *Franchisee:* Comcast of New York, LLC and its lawful and permitted successors, assigns and transferees.
- 1.15. Franchise Fee: The percentage, as specified in this franchise, of Franchisee's "Gross Annual Revenues" remitted to the LFA in exchange for the rights

granted pursuant to the franchise, which shall have the meaning as set forth in Section 622(g) of the Federal Cable Act.

- 1.16. Government Access Channel: An Access Channel available for the noncommercial use of the LFA.
- 1.17. Gross Annual Revenues: Revenue received by Franchisee from the operation of the Cable System in the Franchise Area to provide Cable Services, calculated in accordance with generally accepted accounting principles, including but not limited to monthly Basic Cable Service, premium and pay-per-view fees, installation fees, and equipment rental fees. Gross Annual Revenue shall not include fees on subscriber fees, advertising or home shopping revenues, leased access fees, refundable deposits, bad debt, late fees, investment income, nor any taxes, fees or assessments imposed or assessed by any governmental authority and collected by Licensee on behalf of such entity.
- 1.18. Local Franchise Authority (LFA): The Town of Somers, New York, or the lawful successor, transferee, or assignee thereof.
- 1.19. *Normal Business Hours:* Those hours during which most similar businesses in the community are open to serve customers. In all cases, "normal business hours" must include some evening hours at least one night per week and/or some weekend hours.
 - 1.20. NY PSC: The New York Public Service Commission.
- 1.21. *PEG*: Public, Educational, and Governmental, as such are related to Access Channels.
- 1.22. *Person:* An individual, partnership, association, joint stock company, trust, corporation, or governmental entity.
- 1.23. Primary Service Area: That geographic portion of the Franchise Area in which Franchisee has provided, and continues to provide, cable service to residents of the LFA, as described on Exhibit A appended hereto; such Primary Service Area shall include all residences within the Heritage Hills Community area of the LFA as well as any locations adjacent thereto, to which cable service is not offered by any other VSP authorized by the LFA, and to which service may be extended without a contribution-in-aid-of-construction consistent with the requirements of Section 895.5 of the rules of the NY PSC.
- 1.24. *Public Access Channel:* A channel designated for noncommercial use by the public on a first-come, first-served, nondiscriminatory basis.

- 1.25. *Public Buildings*: Those buildings owned or leased by the Franchising Authority for government administrative purposes and shall not include buildings owned by Franchising Authority but leased to third parties or buildings such as storage facilities at which government employees are not regularly stationed.
- 1.26. Public Rights-of-Way: The surface of, and the space above and below, any public street, highway, freeway, bridge, land path, alley, court, boulevard, sidewalk, way, lane, public way, drive, circle, including all streets, sidewalks, ways, lanes, drives, land path, alley, court or circle within the LFA or the roads, lanes and ways of the Heritage Hills community, or other public right-of-way, including, but not limited to, public utility easements, dedicated utility strips, or rights-of-way dedicated for compatible uses and any temporary or permanent fixtures or improvements located thereon now or hereafter held by the Franchising Authority in the Franchise Area, which shall entitle the Franchisee to the use thereof for the purpose of installing, operating, repairing, and maintaining the Cable System. Public Way shall also mean any easement now or hereafter held by the Franchising Authority within the Franchise Area for the purpose of public travel, or for utility or public service use dedicated for compatible uses, and shall include other easements or rights-of-way as shall within their proper use and meaning entitle the Franchisee to the use thereof for the purposes of installing, operating, and maintaining the Franchisee's Cable System over poles, wires, cables, conductors, ducts, conduits, vaults, manholes, amplifiers, appliances, attachments, and other property as may be ordinarily necessary and pertinent to the Cable System.
- 1.27. Renewal Agreement: Means this Agreement or any amendments or modifications in accordance with the terms herein.
- 1.28. *Subscriber:* A Person who lawfully receives Cable Service over the Cable System with Franchisee's express permission.
- 1.29. *Subscriber Network*: The trunk and feeder signal distribution network over which video and audio signals are transmitted to Subscribers.
- 1.30. *Title VI:* Title VI of the Federal Cable Act, Cable Communications, as amended.
 - 1.31. Transfer of the Franchise:
 - 1.31.1. Any transaction in which:
 - 1.31.1.1. a fifty percent ownership or other interest in Franchisee is transferred, directly or indirectly, from one Person or group of Persons to another Person or group of Persons, so that Control of Franchisee is transferred; or

- 1.31.1.2. the rights held by Franchisee under the Franchise and the certificate of confirmation issued therefor by the NY PSC are transferred or assigned to another Person or group of Persons.
- 1.31.2. However, notwithstanding Sub-subsections 1.31.1.1 and 1.31.1.2 above, a *Transfer of the Franchise* shall not include transfer of an ownership or other interest in Franchisee to the parent of Franchisee or to another Affiliate of Franchisee; transfer of an interest in the Franchise or the rights held by the Franchisee under the Franchise to the parent of Franchisee or to another Affiliate of Franchisee; any action which is the result of a merger of another Affiliate of the Franchisee.
- 1.32. *Video Programming:* Shall be defined herein as it is defined under Section 602 of the Federal Cable Act, 47 U SC. § 522(20), as amended.
- 1.33. Video Service Provider ("VSP"): Any entity using the public rights-of-way or other mechanism to provide multiple video programming services to subscribers, for purchase or at no cost, regardless of the transmission method, facilities, or technology used. A VSP shall include but is not limited to any entity that provides cable services, multichannel multipoint distribution services, broadcast satellite services, satellite-delivered services, wireless services, and Internet-Protocol based services.

2. GRANT OF AUTHORITY; LIMITS AND RESERVATIONS

- 2.1. Grant of Authority: Pursuant to the Cable Act, the regulations of the FCC and the Cable Law, the LFA hereby grants a non-exclusive franchise to Franchisee. subject to the terms and conditions of this Agreement, the LFA hereby grants the Franchisee the right to own, construct, operate and maintain a Cable System along the Public Rights-of Way within the Franchise Area, in order to provide Cable Service. No privilege or power of eminent domain not otherwise available to Franchisee under law is bestowed by this grant; nor is such a privilege or power bestowed by this Agreement. Nothing herein shall preclude Franchisee from offering any other service over the Cable System as may be lawfully allowed.
- 2.2. Effective Date and Term: This Franchise shall become effective on the date that the NY PSC issues a certificate of confirmation or an Order Approving Renewal for this Franchise (the "Effective Date"), following its approval by the LFA's governing authority authorized to grant franchises and its acceptance by the Franchisee. The term of this Franchise shall be ten (10) years from the Effective Date unless the Franchise is earlier revoked as provided herein. The Franchisee shall memorialize the Effective Date by notifying the LFA in writing of the same, which notification shall become a part of this Franchise.

- 2.3. Grant Not Exclusive: The Franchise and the rights granted herein to use and occupy the Public Rights-of-Way to provide Cable Services shall not be exclusive, and the LFA reserves the right to grant other franchises for similar uses or for other uses of the Public Rights-of-Way, or any portions thereof, to any Person, or to make any such use itself, at any time during the term of this Franchise. Any such rights which are granted shall not adversely impact the authority as granted under this Franchise and shall not interfere with existing facilities of the Cable System or Franchisee's Network.
- 2.4. Franchise Subject to Federal and State Law: Notwithstanding any provision to the contrary herein, this Franchise is subject to and shall be governed by all applicable lawful provisions of federal law and state law and FCC and NY PSC rules, regulations, standards, and orders, as may be amended, including but not limited to the Federal Cable Act.

2.5. No Waiver:

- 2.5.1. The failure of the LFA on one or more occasions to exercise a right under this Franchise, the Cable Law or other applicable state or federal law, or to require compliance or performance under this Franchise, shall not be deemed to constitute a waiver of such right or a waiver of compliance or performance of this Agreement, nor shall it excuse Franchisee from compliance or performance, unless such right or such compliance or performance has been specifically waived in writing.
- 2.5.2. The failure of the Franchisee on one or more occasions to exercise a right under this Franchise, the Cable Law or other applicable state or federal law, or to require performance under this Franchise, shall not be deemed to constitute a waiver of such right or a waiver of performance of this Agreement, nor shall it excuse the LFA from performance, unless such right or such performance has been specifically waived in writing.
- 2.6. Construction of Agreement: Nothing herein shall be construed to limit the scope or applicability of Section 625 of the Federal Cable Act, 47 U.SC § 545, as amended.
- 2.7. Police Powers: The LFA shall not enact any local laws that are inconsistent with this Franchise, provided, however, that nothing in this Franchise shall be construed to prohibit the reasonable, necessary and lawful exercise of the police powers of the LFA in a manner not materially in conflict with the privileges granted in this Franchise and consistent with all federal and state laws, regulations and orders

- 2.8. Restoration of Municipal Property: Any municipal property damaged or destroyed by the Franchisee's employees or agents shall be promptly repaired or replaced by the Franchisee and restored to a serviceable condition.
- 2.9 Restoration of Property: Franchisee shall upon written request promptly and reasonably repair and restore property that is damaged as a result of construction, installation, repair or maintenance of the Cable System within a reasonable time, weather permitting.

3. PROVISION OF CABLE SERVICE

3.1. Area to be served:

- 3.1.1. The Franchisee shall continue to make Cable Service available to every residential dwelling unit within the Primary Service Area or receiving service from Franchisee at the time of the execution of this Agreement and shall extend cable service upon request within the Primary Service Area or within the service area defined as the Heritage Hills community within the Town of Somers (as described in Exhibit A appended hereto) where the minimum density is at least thirty (30) dwelling units per aerial mile and sixty (60) dwelling units per underground mile provided however, that such dwelling units are within one (1) mile of the existing Cable System, at a location not otherwise served by another VSP, and that the Franchisee is able to obtain from property owners any necessary easements and/or permits in accordance with state law or the Federal Cable Act.
- 3.1.2. The Franchisee may impose a contribution-in-aid-of-construction in excess of its regular installation charge for any service installation requiring a drop or line extension in excess of the standards set forth in 16 NYCRR §895.5. Any such additional charge shall be computed on a time plus materials basis to be calculated on that portion of the installation that exceeds the standards set forth in 16 NYCRR §895.5.
- 3.1.3. Installation costs shall conform with the Cable Law and the Federal Cable Act. Any dwelling unit within one hundred fifty feet (150 ft.) aerial or one hundred twenty-five feet (125 ft.) underground of the Distribution Cable shall be entitled to a Standard Installation Charge, unless the sub-surface is a hard surface or requires boring through rock or a similar hard surface (i.e., concrete, asphalt, etc.). Installations of more than one hundred twenty-five feet (125 ft.) or which involve a hard surface or which require boring shall be provided at a rate established by the Franchisee in accordance with applicable federal and state laws. For installations more than one hundred twenty-five feet (125 ft.), not involving a hard surface, the first one hundred twenty-five feet (125 ft.) shall be at the Standard Installation Charge.

10

- 3.1.4. Provided Franchisee has at least ninety (90) days' prior written notice concerning the opening of residential subdivision trenching, or of the installation of conduit for the location of utilities, it shall install its cable in such trenching or conduits or may seek permission to utilize alternative trenching or conduits within a comparable time frame. If a substantial quantity of cable is required for a large subdivision and said quantity is not in stock, the Franchisee shall be allowed additional time for said installation. The Franchising Authority, or its designee, shall exercise reasonable efforts to have the Planning Board and developers give timely written notice of trenching and underground construction to the Franchisee. Developer shall be responsible for the digging and back-filling of all trenches.
- 3.1.5. If all of the transmission and distribution facilities of all of the respective public or municipal utilities, if any, in the Franchise Area are underground, the Franchisee shall place its Cable Systems' transmission and distribution facilities underground; provided that (1) such underground locations are actually capable of accommodating the Franchisee's cable and other equipment without technical degradation of the Cable System's signal quality, and (2) the Franchisee is reimbursed for its costs associated with such underground placement if reimbursement is made to any of the other respective utility companies in the Franchise Area. Such reimbursement may be through payment from the LFA. In any area of the Franchise Area where the transmission or distribution facilities of the respective public or municipal utilities are both aerial and underground, the Franchisee shall have the discretion to construct, operate, and maintain all of its transmission and distribution facilities, or any part thereof, aerially or underground. Nothing in this Section shall be construed to require the Franchisee to construct, operate, or maintain underground any groundmounted appurtenances such as customer taps, line extenders, system passive devices, amplifiers, power supplies, pedestals, or other related equipment.
- 3.2. Availability of Cable Service: Franchisee shall make Cable Service available to all residential dwelling units and may make Cable Service available to businesses within the Primary Service Area in conformance with Section 3.1, and Franchisee shall not discriminate between or among any individuals in the availability of Cable Service based upon the income in a local area.
- 3.3. Pole and Conduit Attachment Rights: Permission is hereby granted to the Franchisee to attach or otherwise affix including, but not limited to cables, wire, or optical fibers comprising the Cable Television System to the existing poles and conduits on and under public streets and ways, provided the Franchisee secures the permission and consent of the public utility companies to affix the cables and/or wires to their pole and conduit facilities. By virtue of this Franchise the Franchising Authority grants Franchisee equal standing with power and telephone utilities in the manner of placement of facilities on Public Ways.

11

3.4. *Tree Trimming*: The Franchisee shall have the authority to trim trees or other natural growth upon and overhanging any of its Cable System in the Franchise Area so as to prevent contact with the Franchisee's wires, cables or other equipment. All such trimming shall be done at the Franchisee's sole cost and expense. The Franchisee shall be responsible for any damage caused by such trimming.

4. **SYSTEM FACILITIES**

- 4.1. Quality of Materials and Work: Franchisee shall construct and maintain its System using materials of good and durable quality, and all work involved in the construction, installation, maintenance and repair of the Cable System shall be performed in a safe, thorough and reliable manner.
- 4.2. *System Characteristics*: During the term hereof Franchisee's Cable System shall meet or exceed the following requirements:
- 4.2.1. The Cable System shall be designed and operated in compliance and accordance with Federal regulations and with a minimum bandwidth of 750 MHz
- 4.2.2. The Cable System shall be designed to be an active two-way plant for subscriber interaction, if any, required for the selection or use of Cable Service.
- 4.3. *Interconnection:* The Franchisee shall design its Cable System so that it may be interconnected at the Franchisee's sole discretion with other cable systems in the Franchise Area. Interconnection of systems may be made by direct cable connection, microwave link, satellite, or other appropriate methods.
- 4.4. *Emergency Alert System:* Franchisee shall comply with the Emergency Alert System ("EAS") requirements of the FCC and the State of New York, including the NY PSC's rules and regulations and the current New York EAS Plan, in order that emergency messages may be distributed over the System.
- 4.5. *Parental Control:* Upon request by any Subscriber, and where technologically feasible, the Franchisee shall provide, at applicable rates, such requesting Subscriber with a parental control device. The Franchisee shall bear no responsibility for the exercise of parental controls and shall incur no liability for any Subscriber's or viewer's exercise or failure to exercise such controls.

5. PEG ACCESS CHANNEL(S) AND SUPPORT

- 5.1. *PEG Access Channels*: Use of a channel position for public, educational and governmental ("PEG") access shall be provided by Franchisee in accordance with the Federal Cable Act, Section 611, and as further set forth below. "Channel position" means a number designation on the Franchisee's channel lineup. Franchisee does not relinquish its ownership of or ultimate right of control over a channel by designating it for PEG use. A PEG access user whether an individual, educational or governmental user acquires no property or other interest by virtue of the use of a channel position so designated. Franchisee shall not exercise editorial control over any public, educational, or governmental use of a channel position, except Franchisee may refuse to transmit any public access program or portion of a public access program that contains obscenity, indecency, or profanity. The Franchising Authority shall be responsible for developing, implementing, interpreting and enforcing rules for PEG Access Channel use.
- 5.2. Franchisee shall continue to designate three (3) access channels as follows:
 - 5.2.1. Franchisee will continue to provide for government access programming to Heritage Hills residents from the current interconnection point at Somers Town House;
 - 5.2.2. Franchisee will continue to provide for educational access programming to Heritage Hills residents from the current interconnection point at Somers Town House;
 - 5.2.3. Franchisee will continue to make available a Heritage Hills public access channel to Heritage Hills residents;
- 5.3. *PEG Payment*: Franchisee shall provide a one-time payment in the amount of \$20,000.00 to the Heritage Hills Society for the purpose of purchasing equipment for the Heritage Hills access studio located in the Heritage Hills Activity Center.
- 5.4. Franchisee Use of Fallow Time: Because blank or under-utilized PEG channels are not in the public interest, in the event the Franchising Authority or other PEG access user elects not to fully program its channel(s), Franchisee may program unused time on those channels subject to reclamation by the Franchising Authority upon no less than 60 days' notice.
- 5.5. *Indemnification*: The Franchising Authority shall indemnify Franchisee for any liability, loss, or damage it may suffer due to violation of the intellectual property rights of third parties or arising out of the content of programming shown on any PEG channel and from claims arising out of the Franchising Authority's rules for or administration of the public access channel.

- 5.6. Video Return Lines: Franchisee shall continue to maintain the existing return lines at the Somers Town House (located at 335 Route 202 in Somers) and Heritage Hills Activities Center to allow for upstream signal capability. The demarcation point between the equipment owned, operated and maintained by the Franchisee and the equipment owned operated and maintained by the Franchising Authority or its designee shall be the input of the encoder.
- 5.7. Programming Exclusivity and Non-Competition: The Franchising Authority, or its designee, agrees that it will not use its designated PEG Access channels, equipment, or other facilities to provide for-profit commercial services which have the effect of competing with the Franchisee's business. In addition, any Video Programming produced under the provisions of this Article 5 shall not be commercially distributed to a competing Multichannel Video Programming Distributor or VSP without the written consent of the Franchisee.
- 5.8. *Prices and Charges*: The Franchising Authority acknowledges that under the 1992 Cable Television Consumer Protection and Competition Act, costs of PEG Access and other franchise requirements may be passed through to the Subscribers in accordance with federal law.

6. FRANCHISE FEES

- 6.1. Payment to LFA: Franchisee shall pay to the LFA a Franchise Fee of five percent (5%) of Gross Annual Revenues (the "Franchise Fee"). In accordance with the Cable Act, the twelve (12) month period applicable under the Franchise for the computation of the Franchise Fee shall be a calendar year. Such payments shall be computed semi-annually for the preceding half year, as of December 31 and June 30, and semi-annual payments shall be due and payable no later than forty-five (45) days after the stated dates for computation. The payments are subject to any offsets arising from Article 11, Sections 217 and 218 of the Public Service Law, with documentation and timing of the offsets to be agreed upon by the LFA and Franchisee. Franchisee shall be allowed to submit or correct any payments that were incorrectly omitted, and shall be refunded any payments that were incorrectly submitted, in connection with the semi-annual Franchise Fee remittances within ninety (90) days following the close of the calendar year for which such payments were applicable.
- 6.2. In accordance with Section 622(b) of the Federal Cable Act, the Franchisee shall not be liable for a total financial commitment pursuant to this Renewal Franchise and applicable law in excess of five percent (5%) of its Gross Annual Revenues; provided, however, that said five percent (5%) shall include any amounts included in the definition of "Franchise Fee" pursuant to Section 622(g)(1) of the Federal Cable Act, but shall not include the following: (i) interest due herein to the Franchising

14

Authority because of late payments; and (ii) any other exclusion to the term "Franchise Fee" pursuant to Section 622(g)(2) of the Federal Cable Act.

- 6.3. All payments by the Franchisee to the LFA pursuant to this Section shall be made payable to the Town of Somers and deposited with the Town Treasurer unless otherwise agreed by the parties.
- 6.4. Supporting Information: Each Franchise Fee payment shall be accompanied by a brief report prepared by a representative of Franchisee showing the basis for the computation.
- 6.5. Limitation on Franchise Fee Actions: The parties agree that the period of limitation for recovery of any Franchise Fee payable hereunder shall be three (3) years from the date on which payment by Franchisee is due but cannot exceed the date of records retention reflected in Section 7.
- 6.6. Section 626 Set-Off: Franchisee agrees that it will cease to apply the Franchise Fee as an offset against the special franchise tax provided for in N.Y. Real Property Tax Law Section 626 in the next full calendar month following the issuance by the NY PSC of an order confirming an amended or renewal agreement of each of the existing providers of Cable Service or cable service (as such term may be defined by other providers) in the Service Area if such agreements contain a full and complete waiver of the special franchise tax offset. In addition, the LFA agrees that it shall impose the same full and complete waiver of the special franchise tax offset upon all new providers of Cable Service or cable service (as such term may be defined by other providers) in the Service Area to be expressed in writing in the franchise agreement of each new cable provider. The operation of this Section 6.6 shall be strictly limited to Franchise Fees lawfully imposed upon Cable Service and shall not be construed to affect the Franchisee's rights under any provision of State or Federal law regarding the provision of Cable Service or of services other than Cable Service.

7. **REPORTS AND RECORDS**

- 7.1. Franchisee shall maintain for public inspection all records required by the FCC and as specified in 47 CFR Part 76 in the manner prescribed therein.
- 7.2. To the extent not inconsistent with applicable privacy provisions contained in state or federal law and subject to the provisions of Section 7.3, the LFA reserves the right to inspect all pertinent books, records, maps, plans, financial statements and other like material of the Franchisee, upon reasonable notice and during Normal Business Hours, for the purpose of reviewing Franchisee's compliance with the terms and conditions of this Franchise Agreement. Notice of not less than twenty-one (21) business days shall be deemed "reasonable" for purposes of this section. Notwithstanding

anything to the contrary set forth herein, Franchisee shall not be required to disclose information that it reasonably deems to be proprietary or confidential in nature, nor disclose any of its or an Affiliate's books and records not relating to the provision of Cable Service in the Service Area. The LFA shall treat any information disclosed by Franchisee as confidential and shall only disclose it to employees, representatives, and agents thereof who have a need to know, or in order to enforce the provisions hereof. The LFA, its employees, representatives, and agents may be required to execute a non-disclosure agreement. Franchisee shall not be required to provide Subscriber information in violation of Section 631 of the Federal Cable Act, 47 USC. §551.

7.3. System-Wide Statistics: Any valid reporting requirement in the Franchise may be satisfied with system-wide statistics, except those related to Franchise Fees and consumer complaints.

8. INSURANCE AND INDEMNIFICATION

8.1. *Insurance*:

- 8.1.1. Franchisee shall maintain in full force and effect, at its own cost and expense, during the Franchise Term, the following insurance coverage:
 - 8.1.1.1. Commercial General Liability Insurance in the amount of one million dollars (\$1,000,000) combined single limit for property damage and bodily injury. Such insurance shall cover the construction, operation and maintenance of the Cable System, and the conduct of Franchisee's Cable Service business in the Town.
 - 8.1.1.2. Automobile Liability Insurance in the amount of one million dollars (\$1,000,000) combined single limit for bodily injury and property damage coverage.
 - 8.1.1.3. Workers' Compensation Insurance meeting all legal requirements of the State of New York.
 - 8.1.1.4. Employers' Liability Insurance in the following amounts: (A) Bodily Injury by Accident: \$100,000; and (B) Bodily Injury by Disease: \$100,000 employee limit; \$500,000 policy limit.
 - 8.1.1.5. Excess liability or umbrella coverage of not less than five million dollars (\$5,000,000).
 - 8.1.1.6. The limits required above may be satisfied with a combination of primary and excess coverage

- 8.1.2. The LFA shall be designated as an additional insured under each of the insurance policies required in this Article except Worker's Compensation Insurance, Employer's Liability Insurance, and excess liability or umbrella coverage. Such additional insured requirement shall be indicated on the original Certificates of Insurance.
- 8.1.3. Franchisee shall not cancel any required insurance policy without submitting documentation to the LFA verifying that the Franchisee has obtained alternative insurance in conformance with this Agreement.
- 8.1.4. Each of the required insurance policies shall be with insurers qualified to do business in the State of New York, with an A- or better rating for financial condition and financial performance by Best's Key Rating Guide, Property/Casualty Edition.
- 8.1.5. Upon written request, Franchisee shall deliver to the LFA Certificates of Insurance showing evidence of the required coverage under this Agreement on or before the Effective Date and providing at least thirty (30) days written notice to be given to LFA of cancellation.

8.2. *Indemnification:*

- 8.2.1. Franchisee agrees to indemnify the LFA for, and hold it harmless from, all liability, damage, cost or expense arising from claims of injury to persons or damage to property occasioned by reason of any conduct undertaken pursuant to the construction, installation, upgrade, reconstruction, operation, maintenance or removal of the Cable System, provided that the LFA shall give Franchisee written notice of the LFA's request for indemnification within ten (10) days of receipt of a claim or action pursuant to this Subsection. Notwithstanding the foregoing, Franchisee shall not indemnify the LFA for any damages, liability or claims resulting from the willful misconduct or negligence of the LFA, its officers, agents, employees, attorneys, consultants, independent contractors or third parties or for any activity or function conducted by any Person other than Franchisee in connection with PEG Access or EAS.
- 8.2.2. With respect to Franchisee's indemnity obligations set forth in Subsection 8.2.1, Franchisee shall provide the defense of any claims brought against the LFA by selecting counsel of Franchisee's choice to defend the claim, subject to the consent of the LFA, which shall not be unreasonably withheld. Nothing herein shall be deemed to prevent the LFA from cooperating with the Franchisee and participating in the defense of any litigation by its own counsel at its own cost and expense, provided however, that after consultation with the LFA, Franchisee shall have the right to defend, settle or compromise any claim or action arising hereunder, and Franchisee shall have the authority to decide the appropriateness and the amount of any such settlement. In the

17

event that the terms of any such proposed settlement includes the release of the LFA and the LFA does not consent to the terms of any such settlement or compromise, Franchisee shall not settle the claim or action but its obligation to indemnify the LFA shall in no event exceed the amount of such settlement.

- 8.2.3. The LFA shall hold harmless and defend Franchisee from and against and shall be responsible for damages, liability or claims resulting from or arising out of the willful misconduct or negligence of the LFA.
- 8.2.4. The LFA shall be responsible for its own acts of willful misconduct, negligence, or breach, subject to any and all defenses and limitations of liability provided by law. The Franchisee shall not be required to indemnify the LFA for acts of the LFA which constitute willful misconduct or negligence on the part of the LFA, its officers, employees, agents, attorneys, consultants, independent contractors or third parties.

9. TRANSFER OF FRANCHISE

9.1. Transfer: Subject to Section 617 of the Federal Cable Act, 47 U SC §537, as amended, no transfer of the Franchise shall occur without the prior consent of the LFA, provided that such consent shall not be unreasonably withheld, delayed or conditioned. In considering an application for the transfer of the Franchise, the LFA may consider the applicant's: (i) technical ability; (ii) financial ability; (iii) good character; and (iv) other qualifications necessary to continue to operate the Cable System consistent with the terms of the Franchise. No such consent shall be required, however, for a transfer in trust, by mortgage, by other hypothecation, by assignment of any rights, title, or interest of the Franchisee in the Franchise or Cable System in order to secure indebtedness, or for transactions otherwise excluded under Section 1.31 above.

10. **RENEWAL OF FRANCHISE**

- 10.1. Governing Law: The LFA and Franchisee agree that any proceedings undertaken by the LFA that relate to the renewal of this Franchise shall be governed by and comply with the provisions of this Article, the Cable Law and Section 626 of the Federal Cable Act, 47 USC § 546, as amended.
- 10.2. Needs Assessment: In addition to the procedures set forth in Section 626 of the Federal Cable Act, the LFA shall notify Franchisee of all of its assessments regarding the identity of future cable-related community needs and interests, as well as the past performance of Franchisee under the then current Franchise term. Such assessments shall be provided to Franchisee by the LFA promptly so that Franchisee will

have adequate time to submit a proposal under 47 US C § 546 and complete renewal of the Franchise prior to expiration of its term.

- 10.3. *Informal Negotiations:* Notwithstanding anything to the contrary set forth herein, Franchisee and the LFA agree that at any time during the term of the then current Franchise, while affording the public appropriate notice and opportunity to comment, the LFA and Franchisee may agree to undertake and finalize informal negotiations regarding renewal of the then current Franchise and the LFA may grant a renewal thereof.
- 10.4. Consistent Terms: Franchisee and the LFA consider the terms set forth in this Article to be consistent with the express provisions of 47 USC § 546 and the Cable Law.

11. ENFORCEMENT AND TERMINATION OF FRANCHISE

- 11.1. *Notice of Violation*: If at any time the LFA believes that Franchisee has not complied with the terms of the Franchise, except as excused by Force Majeure, the LFA shall informally discuss the matter with Franchisee. If these discussions do not lead to resolution of the problem in a reasonable time, the LFA shall then notify Franchisee in writing, by certified mail, of the exact nature of the alleged noncompliance in a reasonable time (for purposes of this Article, the "Noncompliance Notice").
- 11.2. Franchisee's Right to Cure or Respond: Franchisee shall have sixty (60) days from receipt of the Noncompliance Notice to: (i) respond to the LFA, if Franchisee contests (in whole or in part) the assertion of noncompliance; (ii) cure such noncompliance; or (iii) in the event that, by its nature, such noncompliance cannot be cured within such sixty (60) day period, initiate reasonable steps to remedy such noncompliance and notify the LFA of the steps being taken and the date by which Franchisee projects that it will complete cure of such noncompliance. Upon cure of any noncompliance, the LFA shall provide written confirmation that such cure has been affected.
- 11.3. Public Hearing: The LFA shall schedule a public hearing if the LFA seeks to continue its investigation into the alleged noncompliance (i) if Franchisee fails to respond to the Noncompliance Notice pursuant to the procedures required by this Article, or (ii) if Franchisee has not remedied the alleged noncompliance within sixty (60) days or the date projected pursuant to Section 11.2(iii) above. The LFA shall provide Franchisee at least sixty (60) business days prior written notice, by certified mail, of such public hearing, which will specify the time, place and purpose of such public hearing, and provide Franchisee the opportunity to be heard.
- 11.4. Within thirty (30) days after said public hearing, the Franchising Authority shall issue a written determination of its findings. In the event that the Franchising

Authority determines that the Franchisee is in such default, the Franchising Authority may determine to pursue any lawful remedy available to it.

- 11.4.1. In the event that (i) the Franchising Authority fails to issue a written reply within 30 days accepting or rejecting Franchisee's response pursuant to 11.1 above; (ii) the Franchising Authority fails to issue a written acknowledgement after Franchisee's notice that it cured said default pursuant to 11.2 above; and/or (iii) the Franchising Authority fails to schedule a public hearing no later than thirty (30) days of having sent a written notice consistent with Section 11.3 above; and/or (iv) the Franchising authority fails to issue a written determination within thirty (30) days after the public hearing pursuant to Section 11.4 above, then the issue of said default against the Franchisee by the Franchising Authority shall be considered null and void.
- 11.5. *Enforcement:* Subject to applicable federal and state law, in the event the LFA, after the public hearing set forth in Section 11.3, determines that Franchisee is in default of any provision of this Franchise, the LFA may:
 - 11.5.1. Seek specific performance of any provision, which reasonably lends itself to such remedy, as an alternative to damages; or
 - 11.5.2. Commence an action at law for monetary damages or seek other equitable relief; or
 - 11.5.3. In the case of a substantial noncompliance with a material provision of this Franchise, seek to revoke the Franchise in accordance with Section 11.6.
- 11.6. Revocation: Should the LFA seek to revoke this Franchise after following the procedures set forth above in this Article, including the public hearing described in Section 11.3, the LFA shall give written notice to Franchisee of such intent. The notice shall set forth the specific nature of the noncompliance. The Franchisee shall have ninety (90) days from receipt of such notice to object in writing and to state its reasons for such objection. In the event the LFA has not received a satisfactory response from Franchisee, it may then seek termination of the Franchise at a second public hearing. The LFA shall cause to be served upon the Franchisee, at least thirty (30) business days prior to such public hearing, a written notice, by certified mail, specifying the time and place of such hearing and stating its intent to revoke the Franchise.
 - 11.6.1. At the designated public hearing, Franchisee shall be provided a fair opportunity for full participation, including the rights to be represented by legal counsel, to introduce relevant evidence, to require the production of evidence, to compel the relevant testimony of the officials, agents, employees or consultants of the LFA, to compel the testimony of other persons as permitted by

law, and to question and/or cross examine witnesses. A complete verbatim record and transcript shall be made of such hearing.

- 11.6.2. Following the second public hearing, Franchisee shall be provided up to thirty (30) days to submit its proposed findings and conclusions to the LFA in writing and thereafter the LFA shall determine (i) whether an event of default has occurred under this Franchise; (ii) whether such event of default is excusable; and (iii) whether such event of default has been cured or will be cured by the Franchisee. The LFA shall also determine whether it will revoke the Franchise based on the information presented, or, where applicable, grant additional time to the Franchisee to effect any cure if the LFA determines that it will revoke the Franchise, the LFA shall promptly provide Franchisee with a written determination setting forth the LFA's reasoning for such revocation. Franchisee may appeal such written determination of the LFA to an appropriate court, which shall have the power to review the decision of the LFA de novo. Franchisee shall be entitled to such relief as the court finds appropriate. Such appeal must be taken within sixty (60) days of Franchisee's receipt of the written determination of the LFA.
- 11.6.3. The LFA may, at its sole discretion, take any lawful action that it deems appropriate to enforce the LFA's rights under the Franchise in lieu of revocation of the Franchise.
- 11.7. Abandonment of Service: Franchisee shall not abandon any Cable Service or portion thereof without the LFA's prior written consent as provided in the Cable Law.

12. MISCELLANEOUS PROVISIONS

- 12.1 Franchisee Representative: The Franchisee shall provide the Town with contact information at which a representative of the Franchisee may be contacted related to the terms and conditions of this Franchise.
- 12.2. Actions of Parties: In any action by the LFA or Franchisee that is mandated or permitted under the terms hereof; such party shall act in a reasonable, expeditious, and timely manner. Furthermore, in any instance where approval or consent is required under the terms hereof, such approval or consent shall not be unreasonably withheld, delayed or conditioned.
- 12.3. *Binding Acceptance:* This Agreement shall bind and benefit the parties hereto and their respective heirs, beneficiaries, administrators, executors, receivers, trustees, successors and assigns, and the promises and obligations herein shall survive the expiration date hereof.

12.4. Preemption, Incorporation by Reference:

- 12.4.1. In the event that federal or state law, rules, or regulations preempt a provision or limit the enforceability of a provision of this Agreement, the provision shall be read to be preempted to the extent, and for the time, but only to the extent and for the time, required by law. In the event such federal or state law, rule or regulation is subsequently repealed, rescinded, amended or otherwise changed so that the provision hereof that had been preempted is no longer preempted, such provision shall thereupon return to full force and effect, and shall thereafter be binding on the parties hereto, without the requirement of further action on the part of the LFA.
- 12.4.2. All presently and hereafter applicable conditions and requirements of federal, state and generally applicable local laws, including but not limited to Article 11 of the New York State Public Service Law, and the rules and regulations of the FCC and the NY PSC, as they may be amended from time to time, are incorporated herein by reference, to the extent not enumerated herein. However, no such generally applicable local laws, rules, regulations and codes, as amended, may alter the obligations, interpretation and performance of this Renewal Franchise to the extent that any provision of this Renewal Franchise conflicts with or is inconsistent with such generally applicable local laws, rules or regulations.
- 12.4.3. Should the State of New York, the federal government or the FCC require the Franchisee to perform or refrain from performing any act the performance or non-performance of which is inconsistent with any provisions herein, the Franchising Authority and the Franchisee will thereupon, if they determine that a material provision herein is affected, modify any of the provisions herein to reflect such government action.
- 12.5. Force Majeure: Franchisee shall not be held in default under, or in noncompliance with, the provisions of the Franchise, nor suffer any enforcement or penalty relating to noncompliance or default, where such noncompliance or alleged defaults occurred or were caused by a Force Majeure.
- 12.5.1. Furthermore, the parties hereby agree that it is not the LFA's intention to subject Franchisee to penalties, fines, forfeitures or revocation of the Franchise for violations of the Franchise where the violation was a good faith error that resulted in no or minimal negative impact on Subscribers, or where strict performance would result in practical difficulties and hardship being placed upon Franchisee that outweigh the benefit to be derived by the LFA and/or Subscribers.
- 12.6. *Notices:* Unless otherwise expressly stated herein, notices required under the Franchise shall be mailed first class, postage prepaid, nationally recognized overnight courier service or other means as allowed by applicable law and providing for a

22

receipt as proof of delivery to the addressees below, each party may change its designee by providing written notice to the other party.

12.6.1. Notices to Franchisee shall be mailed to:

Comcast Cable Communications, Inc.

Attn: VP, Government/Regulatory Affairs & Community Impact 222 New Park Drive Berlin, CT 06037

with copies to:

Comcast Cable Communications, Inc. Attn: Senior Vice President, Government Affairs 676 Island Pond Road Manchester, NH 03109

Comcast Cable Communications, Inc. Attn: Government Affairs

One Comcast Center

1701 John F. Kennedy Boulevard

Philadelphia, PA 19103

12.6.2. Notices to the LFA shall be mailed to:

Town Supervisor Town of Somers, Town House 335 Route 202 Somers, NY 10589

12.6.3. with a copy to:

Heritage Hills Society Board President Heritage Hills of Westchester 8 Heritage Hills Somers, NY 10589

12.7. Entire Agreement: This Franchise and the Exhibits hereto constitute the entire agreement between Franchisee and the LFA and they supersede all prior or contemporaneous agreements, representations or understandings (whether written or oral) of the parties regarding the subject matter hereof. Any local laws or parts of local laws that materially conflict with the provisions of this Agreement are superseded by this Agreement.

- 12.8. Amendments and Modifications: Amendments and/or modifications to this Franchise shall be mutually agreed to in writing by the parties and subject to the approval of the NY PSC, pursuant to the Cable Law
- 12.9. Captions: The captions and headings of articles and sections throughout this Agreement are intended solely to facilitate reading and reference to the articles, sections and provisions of this Agreement. Such captions shall not affect the meaning or interpretation of this Agreement
- 12.10. Severability: If any section, subsection, sub-subsection, sentence, paragraph, term, or provision hereof is determined to be illegal, invalid, or unconstitutional by any court of competent jurisdiction or by any state or federal regulatory authority having jurisdiction thereof, such determination shall have no effect on the validity of any other section, subsection, sentence, paragraph, term or provision hereof, all of which will remain in full force and effect for the term of the Franchise.
- 12.11. *Recitals:* The recitals set forth in this Agreement are incorporated into the body of this Agreement as if they had been originally set forth herein.
- 12.12. NY PSC Approval: This Franchise is subject to the approval of the NY PSC. Franchisee shall file an application for such approval with the NY PSC within sixty (60) days after the date hereof. Franchisee shall also file any necessary notices with the FCC.
- 12.13. *Rates and Charges:* The rates and charges for Cable Service provided pursuant to this Franchise shall be subject to regulation in accordance with federal law.
- 12.14. *Publishing Information:* LFA hereby requests that Franchisee omit publishing information specified in 47 C.F.R § 76.952 from Subscriber bills.
- 12.15. Employment Practices: Franchisee will not refuse to hire, nor will it bar or discharge from employment, nor discriminate against any person in compensation or in terms, conditions, or privileges of employment because of age, race, creed, color, national origin, or sex.
- 12.16. Identification of Franchisee's Employees, Contractors and Subcontractors: Each employee of the Franchisee who routinely comes into contact with members of the public at their places of residence must wear a picture identification card clearly indicating his or her employment with the Franchisee. The photograph on the identification card shall prominently show the employee's name and/or identification number. Such employee shall prominently display such identification card and shall show it to all such members of the public. Each employee of any contractor or subcontractor of the Franchisee who routinely comes into contact with members of the public at their

places of residence must wear a picture identification card clearly indicating his or her name, the name of such contractor or subcontractor and the name of the Franchisee.

- 12.17. Customer Service: Franchisee shall comply with the consumer protection and customer service standards set forth in Part 76 of the rules of the FCC, and Parts 890 and 896 of the NY PSC rules and regulations, including, without limitation, those relating specifically to service outage credits, customer service and complaint resolution standards (such as those now set forth in federal rules at 47 U.S.C. §76.309, and New York State rules at 16 NYCRR §§890.65, 890.70 and 890.90).
- 12.18. *No Third-Party Beneficiaries:* Except as expressly provided in this Agreement, this Agreement is not intended to, and does not, create any rights or benefits on behalf of any Person other than the parties to this Agreement.
- 12.19. *LFA Official*: The Town Supervisor of the LFA is the LFA official that is responsible for the continuing administration of this Agreement.
- 12.20. No Waiver of LFA's Rights: Notwithstanding anything to the contrary in this Agreement, no provision of this Agreement shall be construed as a waiver of the LFA's rights under applicable federal and state law.

WITNESS OUR HANDS AND OFFICIAL SEAL, THIS ___ DAY OF _____, 2021.

TOWN OF SOMERS	
By:	
Rick Morrissey	
Town Supervisor	
COMCAST OF NEW YORK, L	LC
By:	

EXHIBIT - A

PRIMARY SERVICE AREA

Primary Service Area: That geographic portion of the Franchise Area in which Franchisee has provided, and continues to provide, cable service to residents of the LFA, consisting of all that area within the Town of Somers that is occupied and operated as the Heritage Hills residential community, the condominiums of which have established the Heritage Hills Society.



COMMITMENT & INTEGRITY DRIVE RESULTS

800 Westchester Avenue | Suite N507 Rye Brook, New York 10573 www.woodardcurran.com

T 800.426.4262 T 914.448.2266 F 914.448.0147

Via Electronic Mail

April 26, 2021

Supervisor Rick Morrissey Town of Somers Town Hall 335 Rt. 202 Somers, NY 10589

Re: Proposal for Professional Services

Planning Department Support

Dear Supervisor Morrissey and Town Board:

Woodard & Curran is pleased to present this proposal to assist the Town of Somers with municipal planning services. This extension of our existing engineering professional services support will provide the Town with coverage for technical support and guidance to administrative staff following the retirement of the Town's Director of Planning.

Scope of Services - Planning Support

Woodard & Curran will partner with David B. Smith, sole proprietor of Planning and Development Advisors (PDA), to provide planning support services to the Town. Woodard & Curran and PDA currently work together to provide technical and planning support to other Westchester County municipalities, and this partnership between Woodard & Curran and Mr. Smith will provide consistency, balance, and increased efficiency in technical reviews for applications in front of the Planning Board. As described in the attached Firm Profile and Proposal from PDA, Mr. Smith has over 30 years of planning experience, including providing planning services for multiple municipalities in Westchester County, and will provide a continuation of the planning services provided by the Town's prior Director of Planning.

The combined Woodard & Curran/PDA team will provide the Town with approximately 16 hours per week of technical support to the Planning and Engineering Departments' existing administrative staff, including the following services:

- Assist with inquiries from the public and business community;
- Provide technical input on permit applications to the Planning Board, including review in the context of the Town's Master Plan;
- Coordinate outside consultant review of permit applications where required (e.g traffic consultant);
- Prepare Planning Board Agendas with assistance from Town staff;
- Provide technical assistance during Planning Board meetings;
- Prepare draft and final Resolutions for the Planning Board (with the exception of Environmental Permit resolutions, which will continue to be managed in house);
- · Prepare Planning Board meeting minutes;





- Requesting funds from applicants for escrow accounts;
- Coordinate existing and future Town-secured grant applications and paperwork;
- Work with the Town's grant consultant (J O'Connell) to support Town grants;
- Develop an assessment of opportunities to improve workflow and use of technology tools to update and streamline application processing; and
- Other duties as budget allows.

Woodard & Curran will provide the main coordination and administrative support for our planning support services. PDA will provide planning services, including assistance with technical reviews, representation at Planning Board meetings, preparation of meeting minutes, and additional planning services as requested. On an average weekly basis, approximately 10 hours of time are anticipated to be by Woodard & Curran staff, and 6 hours by PDA.

This work will be performed through a combination of in-office and remote work, as required to complete the duties, including "office hours" and scheduled meetings with applicants and the public, and regular coordination meetings with Town staff, including at least two half-days (3 hours each) in the Planning Office. In-office support will be by Mr. Smith, supplemented by Woodard & Curran's technical staff, on a schedule and need determined through coordination with Town staff based on support needs.

The Town's existing Planning and Engineering administrative staff will continue to perform their existing duties, including:

- Process invoices received from Woodard & Curran, Hardesty & Hanover, Town Attorney, Halston Media, and others;
- Prepare Environmental Public Hearing Notices for Planning Board Environmental items;
- Prepare and distribute circulation list to applicants, at the direction of the Planner;
- Prepare and distribute agenda letters to applicants, at the direction of the Planner;
- Prepare and distribute Lead Agency Notices and Findings, at the direction of the Planner;
- Compile and distribute Planning Board item submittals, at the direction of the Planner;;
- Respond to Planning emails, in coordination with the Planner; and
- Answer Phone calls with Planning Questions/Concerns, in coordination with the Planner.

The division of tasks between Woodard & Curran, PDA, and Town staff and targeted monthly fee will be reassessed regularly to find the right balance as our teams work together to efficiently support the Town and its residents.

Woodard & Curran and PDA will each provide the services above on a Time and Materials basis. Woodard & Curran's service will be provided accordance with our March 11, 2009 authorized Terms and Conditions and our current Rate Table with the Town at the time of service. PDA will be retained by the Town under a separate agreement to provide a direct contractual mechanism between PDA and the Town, per the attached proposal from PDA dated April 21, 2021.



Woodard & Curran will coordinate the overall planning support effort, targeting an <u>estimated average</u> fee of \$10,000 per month plus additional services as authorized. Effort beyond this amount is likely driven by application processing and would be eligible for reimbursement from the Applicant's escrow account, as the Town currently does for the permitting services of its former Director of Planning and professional consultants.

Additional services can be provided if authorized by the Town Board, including:

- · Prepare modifications to existing codes;
- Prepare updates to the Master Plan;
- Provide support to Town Committees and Boards;
- Provide MS4 reporting services;
- Coordinate training and support services from Municity to improve integration of technology into the Planning and Engineering departments (if/as needed depending on the workflow and technology assessment); and
- Develop an assessment of the Town's approach to providing municipal planning services to inform the Town Board's decision on how to approach Planning Services in the long-term.

3

Thank you for the opportunity to continue to provide technical support the Town of Somers.

Sincerely,

WOODARD & CURRAN ENGINEERING AND GEOLOGICAL SERVICES P.A. P.C.

Steven C. Robbins, P.E., LEED AP
Project Manager

Enclosure

SEEN AND AGREED:

Rick Morrissey, Supervisor
Town of Somers

Date



April 21, 2021

Supervisor Rick Morrissey Town of Somers Town Hall 335 Rt. 202 Somers, NY 10589

Re: Planning, Review and Development Services – Town of Somers, NY

Dear Supervisor Morrissey,

Planning & Development Advisors (PDA) is pleased to provide the Town of Somers (the Town) with the following proposed scope of service prepared in conjunction with a companion submission by Woodard & Curran. PDA has been providing planning services to communities throughout the lower Hudson Valley, including current and recent assignments in the Town of Newburgh, Villages of Ardsley, Elmsford, Sleepy Hollow, Irvington and Port Chester. For the Village of Sleepy Hollow, I have been fortunate to assist that community through one of its most important eras of development to date, including the review and approvals of County House Road cluster subdivision, Ichabod's Landing, Kendal on Hudson, Philipse Manor Restoration expansion, Phelps Hospital expansion, General Motors redevelopment into Edge on Hudson, Castle Oil redevelopment, Valley Street senior housing, wireless location plan, recreation study, the recently completed expansion of the Village's reservoir system and relocation of its existing DPW facility. P&DA looks forward to assisting the Town in the review of selected projects and stands ready to assist with additional assignments as they become available.

PDA and Woodard & Curran have an existing long-standing professional relationship having worked together with both the Villages of Ardsley and Sleepy Hollow. As noted in their April 6, 2021 correspondence, PDA would help augment the existing services provided to the Town by Woodard & Curran. As the consulting planner to the Town we would coordinate with their office when plans needed to be reviewed, memos prepared and meetings attended. In the event that other professionals are needed for review we can help coordinate with the Town on the review process. I have provided an updated copy of my professional resume and firm profile for your review.

Accordingly, provided herewith is a retainer agreement for the provision of planning services to the Town of Somers.

Proposed Scope of Work:

P&DA would, at the request of the Town on an on-call basis, and with coordination with the Town Board, Planning Board, other Boards and Commissions and Town staff, typically provide the following, as appropriate:

- project review and consultation with Town Staff and both the Planning Board and Town Board, as appropriate;
- site plan and subdivision reviews;
- on-call projects and reviews, including but not limited to, rezoning applications, planning studies;
- assistance with the preparation of grant applications;
- preparation of environmental review documentation including Short Form EAF, Long Form EAF, Draft and Final Environmental Impact Statements and Environmental Findings;
- preparation of resolutions, and,
- attendance at meetings, public hearings and other presentations.

In addition to the above, it has been requested that this office be available for six (6) hours per week at Town Hall at mutually convenient dates and times to be determined by the Town. It is anticipated that where appropriate work scope items identified above and as time allows would be performed during the proposed in-house hours. The proposed in-house hours will be reevaluated jointly on a regular basis and adjusted to meet the needs of the Town at their direction.

The following hourly fee schedule applies to services rendered as identified in the Proposed Scope of Work for personnel assigned to tasks:

Principal: \$150 Technical/Support \$85

The hourly rate schedule does not include items such as reproduction and printing of plans, documents and specifications and travel which would be billed at our cost.

The accomplishments noted above, and outlined on the attached professional resume, were achieved through close coordination with clients, both municipal and private, department heads, other identified stakeholders and the public. PDA sees an important opportunity to provide these unique skills to assist the Town of Somers. The professional cornerstone of PDA is the ability to create value as part of the planning process through consensus building and incorporating attention to detail. We look forward to working with your community.

You will receive a monthly statement reflecting all services rendered. The monthly statement will also include charges for certain expenses including messenger service, printing and production of documents. Payment to PDA is the sole responsibility of signatory of this Agreement and is not subject to third party agreements.

We hope that you understand that our efforts to provide you with the best possible service at reasonable, professional rates requires that payment of any outstanding balances be made when billed. We cannot continue to provide services when any of our accounts are unpaid for more than thirty days and we reserve the right to suspend or terminate all services until payment is received. Either party has the right to terminate the agreement upon thirty (30) days notice, provided that the Town shall be responsible for payment of all fees earned prior to the date of such termination.

with the Town of Somers. If this proposal is satisfactory, designated below and return a copy for counter-signature	
Kind Regards,	
David B. Smith Principal	
I understand the nature and scope of the proposed representation and agree to be responsible for all fees and charges incurred:	
Accepted by: On behalf of the Town of Somers	Date:

Should you have any questions regarding the above or attached please feel free to contact me directly 914-552-8413 or by email davidbsmith1992@gmail.com. We look forward to continuing working

FIRM PROFILE

Planning & Development Advisors (PDA) is a sole proprietary land use planning and real estate development consulting firm formed in 2014 by David B. Smith. Mr. Smith's career as a planning and development professional has spanned three decades, with extensive experience in providing land use planning, environmental and entitlement services to municipalities, public agencies, not-for-profits, and private developers. Having worked directly with both local government and private real estate development companies, he has an in-depth knowledge of the needs and objectives of both participants in the development process. This background has enabled him to be an effective consensus builder and problem solver who can achieve positive results and efficient designs expeditiously, saving his clients time and costs associated with the length of the approval process.

Mr. Smith utilizes a broad and comprehensive background in planning, engineering, and environmental design to bring projects to a successful conclusion and implementation. A trusted advisor with a proven track-record in successful public outreach, stakeholder negotiations, and owner representation often under time-sensitive constraints and involving complex challenges related to operational land use and local constituent issues.

PDA helps communities and landowners reach sound, informed decisions on issues affecting future development of a region, municipality, neighborhood, special area or particular site. The firm offers services ranging from specific plans and environmental studies to complex development strategies and on-going assistance with approvals and implementation. PDA frequently works with designers, engineers and attorneys as part of a professional team. The firm's knowledge of the development process, and of Federal, state and local environmental requirements, enables it to assist clients in assembling and managing the appropriate mix of disciplines for a particular assignment.

CUSTOMARY AREAS OF SERVICE

Municipal Planning and Zoning

For cities, towns and villages we provide planning services to review site plan, subdivision and special permit applications before various municipal boards and committees. For public and private clients, we develop new zoning ordinances and maps, proposals for code revisions and special districts and subdivision regulations and other land development controls.

- Current Planning Retainers (Villages of Sleepy Hollow, Elmsford, Ardsley and Town of Newburgh, NY)
- Sleepy Hollow Linkage Study
- Port Chester Downtown/Waterfront Linkage Study
- Newburgh Design Guidelines

Comprehensive Planning

For new and existing communities, we produce realistic and achievable comprehensive and master plans to balance needs and resources, guide growth, and program public facilities and services. Our plans recognize the need to provide housing choices, protect environmental resources,



David B. Smith, Principal

Creating value by unlocking opportunity

promote economic development and resolve transportation issues. In addition, the firm has significant experience in the preparation and implementation of Local Waterfront Revitalization Programs. A hallmark of the firm is their ability to effectively engage the public as part of the planning process to create plans that are reflective of constituent needs and concerns.

- Village of Irvington Comprehensive Plan Update (WMPF Planning Award Winner)
- Town of Southampton Eastport/Speonk/Remsenburg/Westhampton/North Sea Area Study
- Village of Greenport LWRP
- Town of Newburgh Comprehensive Plan (Update ongoing)
- Village of Elmsford Comprehensive Plan
- City of Port Jervis LWRP

Environmental Studies

To address the requirements of the New York State Environmental Quality Review Act (SEQRA), the National Environmental Policy Act (NEPA) and other Federal, state and local laws and policies, PDA prepares environmental assessments and impact statements. We also assess the environmental aspects of comprehensive plans and development proposals. We have successfully utilized techniques for review under SEQR that maintained the integrity of the process but made it more time sensitive and focused.

- United Hospital Redevelopment, Port Chester, NY (Entitlements received)
- Sleepy Hollow LDC East Parcel Redevelopment (on-going)
- Rivertowns Square, Dobbs Ferry, NY (Built)
- Peekskill Waterfront Community Redevelopment Plan, Peekskill, NY
- The Collection, White Plains, NY (on-going)
- NYC DEP East of Hudson Police Precinct, Mt. Pleasant, NY (Built)

Community Redevelopment and Brownfields

For municipalities, developers and not-for-profit organizations, we provide studies and plans that address site planning factors for all types of housing; applications for assisted and affordable housing; zoning incentives and other initiatives to create affordable housing; and planning related to redevelopment efforts for communities that have brownfields as part of Brownfield Opportunity Area (BOA) planning.

- The Orchard BOA, City of Glen Cove, NY
- Hudson Park Phase III Residential Community and TOD, Yonkers, NY (Built)
- Orange Avenue TOD Redevelopment, Suffern, NY (Built, marketed as "The Sheldon")
- Senior Housing Zoning, Sleepy Hollow, NY (Approved and built)
- Affordable Housing Zoning, Town of Newburgh
- Urban Renewal Services (Yonkers, Suffern, Port Chester)
- North Chenango River Corridor BOA, Binghamton, NY



David B. Smith, Principal

Creating value by unlocking opportunity

Land Development and Feasibility Studies

For landowners, we provide land development concept plans, physical impact and optimum size for development given site constraints, zoning and other factors. To maximize the return from real estate assets, we prepare due diligence evaluations, feasibility studies and fiscal impact analyses of proposed plans and projects. Evaluations of economic factors are integrated with our physical plans to ensure that they are realistic and implementable.

- Cedar Common mixed use, Dobbs Ferry, NY (on-going)
- Kingsview Subdivision, Mt. Pleasant, NY (approved)
- Garden Road Subdivision, Scarsdale, NY (on-going)
- Corning Hospital Campus Reuse Plan, Corning, NY
- Town of Killingly, CT Industrial Park Site Selection Evaluation
- Quinebaug Valley (CT) Community College Master Plan
- Taconic Tract Residential Community, Mt. Pleasant, NY (on-going)
- Station Lofts, Port Chester, NY (approved)
- 16-18 Main Street, Port Chester, NY (on-going)
- Hale Avenue, White Plains, NY (on-going)

Special Planning Studies

We are often called upon to prepare, or participate in the preparation of, reports and plans that respond to specific client requests that are not within the typical scope of services. The firm will often participate as part of a larger consulting team, often in the coordinating role.

- Downtown White Plains Transit District Study
- McLean Avenue Corridor Plan
- Town of Newburgh Open Space Plan
- Village of Sleepy Hollow Wireless Communication Plan
- Village of Port Chester Inter-modal Transportation Study



Consulting Agreement

This consulting agreement is made the March 1, 2021 (the effective date) until February 28, 2023 by and between Town of Somers, (the Client) and Corporate Plans, Inc. doing business as CPI-HR (the Company).

Whereas, Client wishes to obtain the services of Company set forth herein; and

Whereas, Company wishes to provide such services to Client.

Now, therefore, for good and valuable consideration, the receipt and sufficiency of which is hereby mutually acknowledged, the parties hereby agree as follow:

1. Scope of Services to be provided by Company

Company will provide the following services to the Client with respect to Affordable Care Act (ACA) activities related to Client's health and welfare benefits programs mandated by this law and regulations issued thereunder:

- Consult with Client concerning regulatory tracking and filing requirements for ACA
- Make recommendations and assist with implementation on ACA
- · Report on legislative updates and consult with Client concerning action plans on ACA
- Assist Client with drafting ACA policies and procedures
 - Create a recommended action plan for ACA compliance
 - Review required policies and procedures for implementation
- Employee Tracking Information and Services
 - Advise Client concerning policy on standard measurement, administration and stability periods
 - Track variable employee benefits eligibility using tracking system and payroll information provided by Client
 - o Project financial impacts
- Employer Mandated Notices Requirements
 - Provide mandated notices and action plans for delivery
- Coverage of specific concerns for Client
 - Examine the cost of penalties versus providing coverage
 - Estimate the potential for covering a higher number of participants on the plan
 - o Estimate Cadillac excise tax
 - Using Company Cadillac Tax Calculator and actuary, we will provide a cost analysis with financial impact projections
- Consult with Client concerning ACA questions and concerns
- Provide the 1095 C and assist with Employer Reporting
- Meet with Unions on a as needed basis to review ACA



2. Cost of Services

In consideration of the Services, Client agrees to pay Company a fee of \$8,100 per year. This fee is payable in four quarterly payments with the first installment being billed 6/1/19, for completion of work outlined in the contract and the Services will continue until February 28, 2023, this is a two year agreement. Either party may terminate this Agreement by providing a thirty (30) days' notice to the other party. In the event this agreement is to be terminated, Client shall be entitled to a refund of an equitable portion of any fees that have been paid with respect to periods of time after termination.

3. Personnel

Company will assign its personnel according to the needs of the Client based on the skill and experience of the Company's employees and according to the disciplines reasonably required to complete the appointed task. Company retains the right to substitute personnel.

Primary Service Team: Michael Grinnell, Vice President

Kirsten Tudman, Vice President

4. Clients Responsibility

Client will make available such information as may be reasonably requested for Company to perform the Services. Such information will be provided promptly and will be correct and complete. It is understood by the Consultant that the time of Client's personnel is limited, and judicious use of that time is a requirement of this agreement. Client will make timely payment of the service fee as set forth elsewhere in this agreement.

5. Fiduciary Responsibility

Client acknowledges that: Company shall have no discretionary authority or discretionary control respecting the management of any of the employee benefit plans; Company shall exercise no authority or control with respect to management or disposition of the assets of Clients employee benefit plans; and Company shall preform services pursuant to this agreement in a non-fiduciary capacity. Client agrees to notify Company as soon as possible of any proposed amendments to the plans legal documents to the extent that the amendments would affect Company in the performance of its obligations under this Agreement. Client agrees to submit (or cause its agents or vendors to submit) all information in its (or their) control reasonably necessary for Company to perform the services covered under this agreement.



6. Entire Agreement

This constitutes the entire Agreement between the parties, and any other warranties or agreements are sequent hereby superseded. Subsequent amendments to this Agreement shall only be in writing by both parties.

Town of Somers	
Signature	 Date
Title	
Corporate Plans Inc. (CPI-HR)	
Signature	Date
Title	



Rick Morrisse

From: p desena

Sent: Tuesday, April 27, 2021 3:39 PM

To: Rick Morrissey

Subject: Need for One Way Signage. on Robert Martin Blvd.

Supervisor Morressey

Dear Rick:

Now that Mancini is developing the property along Addson Way, the traffic on Robert Martin Blvd.(RMB) has increased substantially.

Of concern are recent near collisions of traffic coming onto Lovell Street from the south lane of RMB with cars turning into RMB from Lovell Street.

Please set an agenda item and public hearing for one way signage on RMB at the next Town Board meeting.

I believe one of my neighbors has contacted the Planning Board office regarding this matter as well.

One-Way signage will easily solve this problem.

Truly yours,

Patrick DeSena

Might be a good idea also to replace the Dead End sign with a No Outlet sign.

Telephone (914) 277-3539

FAX (914) 277-3790

YOUNG TELEPHONE (914) 277-3790

YOUNG TELEPHONE (914) 277-3790

Town of Somers

WESTCHESTER COUNTY, N.Y.

TOWN HOUSE ANNEX 337 ROUTE 202 SOMERS, NY 10589

THOMAS J. TOOMA JR. Building Inspector



MEMO TO: Town Board

FROM: Thomas J. Tooma Jr.

Building Inspector

RE: Stephanie Cutaia

DATE: April 7, 2021

After the successful canvassing of the Senior Office Assistant – Office Manager list, I respectfully request to appoint Stephanie Cutaia probationary to the Senior Office Assistant – Office Manager full-time position with a start date of April 26, 2021 at an annual salary of Grade 4a, Step 5 of the CSEA salary schedule contingent upon the successful results of a physical, background check, and drug test.

cc: Town Clerk

Seat to:
TB,TA,TC + Barbara T.
5/4/21
KD

OFFICE OF THE SUPERVISOR

Telephone (914) 277-3637 Fax (914) 276-0082 Town of Somers

SOMERS TOWN HOUSE 335 ROUTE 202 SOMERS, NY 10589

WESTCHESTER COUNTY, N.Y.

RICK MORRISSEY SUPERVISOR



May 3, 2021

Memo

TO:

Town Board

FROM:

Kim DeLucia, Executive Assistant to the Supervisor

RE:

Erica Gentile

We've received the canvas list for a full-time Nutrition Site Manager given that Margaret Eichorn has retired. We canvassed the list and broke the list since there weren't three candidates interested in the position thus making it a non-binding eligible list.

Barbara Taberer requested we hire Erica Gentile as a provisional Nutrition Site Manager. I am requesting the Town Board authorize the Supervisor to appoint Erica Gentile as provisional Nutrition Site Manager at Grade 4, Step 5 of CSEA Contract at an annual salary of \$49,282 effective May 1, 2021.

Erica will need to take a future dated exam, pass, and be reachable by the Rule of Three to have her status changed from provisional to probationary.

Thank you.

Cc: Barbara Taberer – Nutrition Program Director Patty Kalba - Town Clerk Roland Baroni – Town Attorney



From:

Teresa Stegner

Sent: To: Monday, April 12, 2021 2:41 PM Patricia Nicolosi; Kim DeLucia

Subject:

RE: Town of Somers - Assessment Board of Review

Hi Pat and Kim,

Thave no objection. Pat would be a welcomed member to the Board of Assessment Review.

feresa Stegner, IAO Assessor Town of Somers 335 Route 202 Somers, NY 10589 (914) 277-3504

From: Patricia Nicolosi

Sent: Monday, April 12, 2021 2:39 PM
To: Kim DeLucia <kdelucia@somersny.com>
Cc: Teresa Stegner <tstegner@somersny.com>

Subject: Re: Town of Somers - Assessment Board of Review

Hi Rick and Kim, Thanks for reaching out to me re: assessment Board of Review. I am most definitely interested in taking that position. As long as it's ok with Teresa Stegner, I'll be happy to fill that position.

Sent from my iPad

On Apr 12, 2021, at 1:15 PM, Kim DeLucia < kdelucia@somersny.com > wrote:

Good afternoon Pat,

It was nice to speak with you earlier today.

As discussed, there is an opening on the Assessment Board of Review. It is for a 5-year term ending 9/30/2025.

Based on your previous interest in joining the Assessment Board of Review, Supervisor Morrissey asked me to reach out to you to see if you are interested in filling the vacancy.

Please reply to all of this email with your interest.

Thank you,

Kim

Kim DeLucia Executive Assistant to Rick Morrissey, Town Supervisor

PLANNING AND ENGINEERING DEPARTMENTS

Telephone (914) 277-5366 Fax (914) 277-4093

Town of Somers

WESTCHESTER COUNTY, N.Y.

SOMERS TOWN HOUSE \$85 ROUTE 202 SOMERS, NY 10589 www.somersuy.com

Steven Woelfle
Principal Engineering Technician
swoelfle@somersny.com





Date: April 30, 2021

To: Town Board ✓ Planning Board

Open Space Committee

Energy Environment Committee

Town Clerk

From: Engineering Department

Re: The following is submitted for your review and comment:

Project Name: NYCDEP Wetland Application
Plan: 2021 Hydrilla Management Project

Received: April 29, 2021
Prepared by: NYCDEP

Referral is made under the provisions of the following regulations:

1.	Informal Discussion:	
2.	Final Subdivision Approval:	
3.	Preliminary Subdivision:	
4.	Site Plan:	
5.	Wetland Activity Permit: Administrative Planning Board	28.14-25-1 X
6.	Steep Slope Permit: Administrative Planning Board	
7	Other	

APPLICATION FEE: Alteration of Wetlands: \$200 minimum fee thereof to be disturbed. Annual Maintenance Permit Renewal Fee \$75.00				
OWNER: The City of New York Mailing Address: 59-17 Junction Blvd, Flus APPLICANT: Michael Usai Mailing Address: State authority: Deputy Chief NRD If other	Tel.	#:		in writing.
PREMISES: Sheet: 28.14Block: 25 L Situated on the South side of Route 100 intersection of Moseman Ave)	(Street)	(Street), <u>0</u>	feet from the
	Vetland Control No Dec Cleaned: Water su I ON: C. COPOSED CON DATED: Cation.**	r H4C One on Area: No Y. 0 CUT	Genesis u to 150	b total for the season
LIST OF PROPERTY OWNERS OF REC WITHIN 100 FEET OF SUBJECT PROPE NAME ADDRESS		OS AND CLA	IMANTS OF WA	
. APPLICANT'S SIGNATURE: L. Usai OWNER'S SIGNATURE:	Digitally signed by IC ae . sal Date: 2021.04.27 11:13:03 -04'00'	DATE: DATE:		
*APPLICATION MUST BE ACCOMPANIE FORM, COMPLETE PLANS FOR LOT IMP THEY EXIST IN THE FIELD OR AS SHOW	ROVEMENTS,	AND LOCAT	ION MAP OF WI	
	Office Use	Only		
Administrative Permit:				
Planning Board Permit:				

Proposed 2021 Hydrilla Treatment Area Somers (30 Acres)





Chemical Management of Hydrilla for Drinking Water Utilities

Project #4747



Chemical Management of Hydrilla for Drinking Water Utilities



About the Water Research Foundation

The Water Research Foundation (WRF) is a member-supported, international, 501(c)3 research cooperative that advances the science of water to protect public health and the environment. Governed by utilities, WRF delivers scientifically sound research solutions and knowledge to serve our subscribers in all areas of drinking water, wastewater, stormwater, and reuse.

Our subscribers guide our work in almost every way—from planning our research agenda to executing research projects and delivering results. This partnership ensures that our research addresses real-world challenges. Nearly 1,000 water, wastewater, and combined utilities; consulting firms; and manufacturers in North America and abroad contribute subscription payments to support WRF's work. Additional funding comes from collaborative partnerships with other national and international organizations and the U.S. federal government, allowing for resources to be leveraged, expertise to be shared, and broad-based knowledge to be developed and disseminated.

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Research results are disseminated through many channels, including reports, the website, webcasts, workshops, and periodicals.

More information about WRF and how to become a subscriber is available at www.WaterRF.org.

Chemical Management of Hydrilla for Drinking Water Utilities

Prepared by:

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Jointly Sponsored by: Water Research Foundation 6666 West Quincy Avenue, Denver, CO 80235

and

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CONTENTS

LIST OF TABLES	. vii
LIST OF FIGURES	ix
FOREWORD	xi
ACKNOWLEDGMENTS	xiii
EXECUTIVE SUMMARY	. XV
INTRODUCTION AND BACKGROUND	1
HYDRILLA NATURAL HISTORY	3
HYDRILLA CONTROL METHODS	5
Physical and Mechanical Methods	5
Biological Methods	
Chemical Methods	
Bispyribac-Sodium	
Copper Complexes	
Diquat	
Endothall	
Flumioxazin	
Fluridone	
Imazamox	
Penoxsulam	
Topramezone	
HYDRILLA MANAGEMENT CASE STUDIES	. 17
Croton River	17
Cayuga Inlet	
Delaware and Raritan Canal	
Tonawanda Creek/Erie Canal	
Tidal Potomac River	
NEW CROTON RESERVOIR HYDRILLA MANAGEMENT ASSESSMENT	. 25
No Action Alternative	
Physical, Mechanical, and Biological Control Options	
Herbicides Available for Hydrilla Control Applications in New York	
Endothall	
Fluridone	
New Croton Reservoir Hydrilla Workshop	
Recommendations for DEP.	

INVASIVE SPECIES CONTROL AND SOURCE WATER PROTECTION	39
CONCLUSIONS	41
APPENDIX A: SELECT RESOURCES FOR DRINKING WATER UTILITIES	45
APPENDIX B: HYDRILLA MANAGEMENT FREQUENTLY ASKED QUESTIONS AND ANSWERS FOR COMMUNICATIONS AND OUTREACH	47
APPENDIX C: WORKSHOP MATERIALS	51
APPENDIX D: WORKSHOP PRESENTATIONS	59
APPENDIX E: WORKSHOP DISCUSSION SUMMARY	87
REFERENCES	95
ABBREVIATIONS	101

TABLES

1	Biological control species previously introduced to control hydrilla	7
2	Summary of aquatic plant control options considered for hydrilla in the D&R Canal	21
3	Workshop participants	35

FIGURES

1	Hydrilla distribution across HUC8 level watersheds	1
2	Hydrilla distribution by biotype as of 2016	3
3	Hydroraking submersed aquatic plants in the D&R Canal	<i>6</i>
4	Herbicide application in the Erie Canal, North Tonawanda, NY, July 2014	23
5	New Croton Reservoir hydrilla survey results from 2016	27
6	Muscoot Dam	28
7	Invasive species management curve	43

FOREWORD

The Water Research Foundation (WRF) is a nonprofit corporation dedicated to the development and implementation of scientifically sound research designed to help water utilities respond to regulatory requirements and address high-priority concerns. WRF's research agenda is developed through a process of consultation with WRF subscribers and other water professionals. WRF's Board of Directors and other professional volunteers help prioritize and select research projects for funding based upon current and future industry needs, applicability, and past work. WRF sponsors research projects through the Focus Area, Emerging Opportunities, Tailored Collaboration, and Facilitated Research programs, as well as various joint research efforts with organizations such as the U.S. Environmental Protection Agency and the U.S. Bureau of Reclamation.

This publication is a result of a research project fully funded or funded in part by WRF subscribers. WRF's subscription program provides a cost-effective and collaborative method for funding research in the public interest. The research investment that underpins this report will intrinsically increase in value as the findings are applied in communities throughout the world. WRF research projects are managed closely from their inception to the final report by the staff and a large cadre of volunteers who willingly contribute their time and expertise. WRF provides planning, management, and technical oversight and awards contracts to other institutions such as water utilities, universities, and engineering firms to conduct the research.

A broad spectrum of water issues is addressed by WRF's research agenda, including infrastructure and asset management, rates and utility finance, risk communication, green infrastructure, food waste co-digestion, reuse, alternative water supplies, water loss control, and more. The ultimate purpose of the coordinated effort is to help water suppliers provide a reliable supply of safe and affordable water to consumers. The true benefits of WRF's research are realized when the results are implemented at the utility level. WRF's staff and Board of Directors are pleased to offer this publication as a contribution toward that end.

Charles M. Murray
Chair, Board of Directors
Water Research Foundation

Robert C. Renner, PE Chief Executive Officer Water Research Foundation

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EXECUTIVE SUMMARY

KEY FINDINGS

- Hydrilla is an aquatic invasive plant that can outcompete native species and infest lakes and rivers, causing a variety of impacts to water quality, natural resources, and recreational use.
- Control options for hydrilla include biological controls and herbicides, primarily fluridone and endothall.
- It is important to include a robust public outreach component for any hydrilla management program to maintain public confidence in the safety of the drinking water supply.

OBJECTIVES

The primary purpose of this project is to explore best management approaches to the control of the aquatic invasive plant *Hydrilla verticillata* (hydrilla) in drinking water sources. As with other aquatic invasive species, once a hydrilla population is established, management alternatives consist of chemical, biological, physical, or mechanical/manual methods (NCAES 1992). However, hydrilla's ability to reproduce from plant fragments, turions, and tubers has made chemical management with herbicides one of the most common methods of control. Hydrilla poses a unique problem in sources of drinking water because of the potential or perceived risks to public health from herbicides. The objectives of this project, therefore, are to:

- Assess the state of knowledge of herbicide application for the management of hydrilla in drinking water reservoirs and its impacts on treatability, water quality, and human and environmental health
- Review lessons-learned from prior hydrilla management efforts
- Provide an example hydrilla risk assessment to identify potential impacts from hydrilla and management options
- Provide recommendations for mitigation of impacts associated with hydrilla management
- Develop communications resources for public outreach

This project included a literature review specific to hydrilla management and associated herbicide research, in-depth analysis of five case studies and follow-up discussions, and the development of an expert workshop to review the New York City Department of Environmental Protection's (DEP's) hydrilla management options for the New Croton Reservoir.

BACKGROUND

Hydrilla was first introduced into Florida, California, and the Mid-Atlantic states during the 1950s-1980s via the aquarium industry. Over the past decades it has spread throughout the U.S., and it is currently present in 32 states. The Southeast and Texas have the most heavily infested areas, but hydrilla is rapidly expanding into the Midwest and Northeast despite substantial investment in education, management, and control projects. In the coming years it is expected that

more drinking water utilities will be faced with its presence in the rivers, lakes, and reservoirs that serve as sources of drinking water.

Hydrilla is a federally listed aquatic invasive species that has the potential to cause significant economic and environmental impacts once established. Hydrilla is a high priority risk for river and reservoir systems as it can impact water quality, aquatic habitat, and recreational uses. The species forms dense mats of vegetation, outcompeting native species, reducing dissolved oxygen, and raising pH (Langeland 1996). Decay of plant litter can increase natural organic matter in reservoirs, which is a precursor to disinfection byproduct formation. The dense vegetation can also impact flow rates through streams and channels and can clog intake structures. As a result of its ability to reproduce from plant fragments, turions, and tubers, hydrilla spreads easily.

APPROACH

The project team conducted a three-part approach to explore successful hydrilla control methods. First, the team reviewed literature specific to hydrilla life history and control methods to determine the most suitable management options for hydrilla in drinking water sources. The project team then conducted an in-depth review of five case studies in areas of New York, New Jersey, and the tidal Potomac River. Resource managers from the case study partners identified management strategies and lessons learned from unique hydrilla-related challenges. Finally, findings from the case studies and literature review guided the development of a one-day workshop with academic experts, water resource professionals, and case study representatives to review the options under consideration for hydrilla control and identify potential risks to water supplies from hydrilla management.

RESULTS/CONCLUSIONS

Preventing invasive species from becoming established is both the most effective and least costly option for managing hydrilla. Once identified within a waterbody, resource managers must decide between available management options or no action. In most cases, without management hydrilla can be expected to eventually spread to all suitable areas within a waterbody. Shallow, slow-moving waterbodies are at the greatest risk of large-scale infestations that negatively impact beneficial uses. While there are numerous management options available for aquatic plant management, hydrilla's ability to reproduce and spread from plant fragments precludes most options. Benthic barriers and manual removal may work well for small infestations, but biological control with sterile grass carp and chemical management with herbicides are the two most prevalent control options for large-scale management. Specific regulations for introducing grass carp vary between states, but many restrict their use to waterbodies where there is minimal risk of escape. This leaves herbicides as the only feasible option for many locations.

Utilities and water resource managers go to great lengths to protect and improve the quality of drinking water sources. The decision to apply herbicides, even to control a highly invasive plant such as hydrilla, is not taken lightly. Because the primary objective of the drinking water sector is protecting public health, utilities and the public require assurances that the decision to apply herbicides will not result in negative health effects to their customers. Because of the recognition that the negative impacts of pesticides have the potential to outweigh their benefits, the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA 1996) requires that all pesticides, including herbicides, undergo extensive, rigorous testing to determine (1) the efficacy for specific use scenarios and target species, and (2) the potential adverse impacts to human and ecological health.

The registration process for pesticides takes years to complete and requires substantial data prior to any environmental release.

While there are recently approved herbicides that are effective against hydrilla, this project focused on two well-established herbicides for hydrilla control: fluridone and endothall. These two herbicides have been registered for aquatic plant management since 1986 and 1960, respectively, have been used extensively, and have undergone multiple registration reviews and independent assessments. For this project, ten independent assessments of the human health and ecological impacts associated with use of the two herbicides were reviewed. These documents repeatedly came to similar conclusions that these two herbicides would result in no significant adverse effects when properly following the label directions, as required by law.

APPLICATIONS/RECOMMENDATIONS

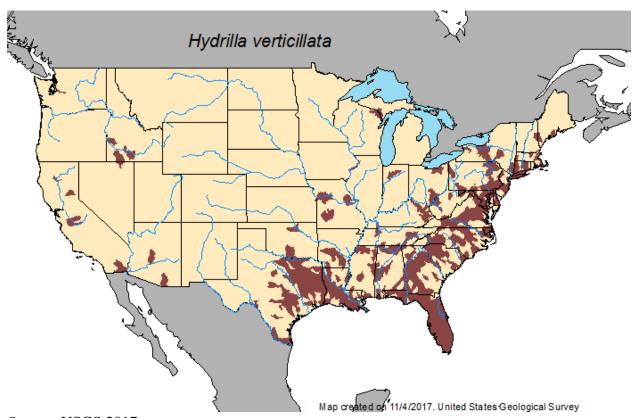
Broadly speaking, no information was identified during the course of this project that would suggest that herbicides should be categorically excluded from sources of drinking water. While the pesticide registration process cannot realistically account for all potential impacts, it is designed to conservatively assess and prevent a broad range of potential negative impacts from pesticide use. However, public perception may remain an obstacle for utilities considering the use of herbicides to manage hydrilla. The case studies reviewed during this project revealed that a focused effort to describe the risks and benefits to the public in advance of the herbicide application was valuable in obtaining stakeholder acceptance. Therefore, it is important to include a robust public outreach component for any hydrilla management program to maintain public confidence in the safety of the drinking water supply. Developing a management plan before hydrilla becomes established will help utilities rapidly respond to the infestation in its early stages, reducing the long-term management costs and improving the potential for success.

RELATED WRF RESEARCH

- Management of Nuisance Aquatic Species at Pacific Northwest Drinking Water Utilities, project #4364
- Milfoil Ecology, Control, and Implications for Drinking Water Supplies, project #3024
- Workshop on Quagga/Zebra Mussel Control Strategies for Water Users in the Western United States, project #4200

INTRODUCTION AND BACKGROUND

Hydrilla verticillata (hydrilla), an invasive aquatic weed, was first introduced in Florida in the 1950s, and subsequently introduced independently in the Mid-Atlantic and California. It has continued to spread throughout the US and is currently present in 32 states with the Southeast and Texas having the most heavily infested areas (Figure 1). Despite substantial investment in management and control projects, hydrilla continues to spread into new regions. In the coming years, it is expected that more drinking water utilities will be faced with its presence in the rivers, lakes and reservoirs that serve as sources of drinking water.



Source: USGS 2017.

Figure 1 Hydrilla distribution across HUC8 level watersheds

Hydrilla, a federally listed noxious weed, is a high priority risk for multi-use reservoir systems. Hydrilla can spread by plant fragments and effectively outcompetes native vegetation. Without management, the species can colonize all viable habitat of rivers and lakes. Growth is limited predominantly by turbidity, high flow rates and light penetration. However, hydrilla can survive well in low light conditions, enabling it to extend into areas that other aquatic plants cannot inhabit.

An infestation can impact water quality, aquatic habitat, and recreational uses. The species forms dense mats of vegetation, reducing dissolved oxygen, and raising pH (Langeland 1996). Decay of plant litter can increase natural organic matter in reservoirs, a precursor to disinfection byproduct formation. Hydrilla is also associated with bald eagle deaths due to toxic cyanobacteria that grow on its leaves (Wilde et al. 2005), as well as fish kills from hypoxic zones due to oxygen

depletion (Cornell Cooperative Extension 2016b). Recreational impacts include difficulty navigating boats through heavily infested waters and risks to swimmers from the dense mats. Small-scale hydrilla infestations may benefit sportfishing, but fish biomass decreases with large infestations (NEANS 2017).

As with other aquatic invasive species, once a hydrilla population is established, management alternatives consist of chemical, biological, physical, or mechanical/manual methods (NCAES 1992). The effectiveness and applicability of each of these options depends on the local environment, regulatory approval, public acceptance, and water supply operations, which must be evaluated to select the proper combination of control methods. Water managers have been battling hydrilla for decades, and chemical management with aquatic herbicides is repeatedly selected as a preferred option for controlling its spread. Applying herbicides in sources of drinking water poses unique risks and requires broad public outreach.

The objectives of this project, therefore, are to:

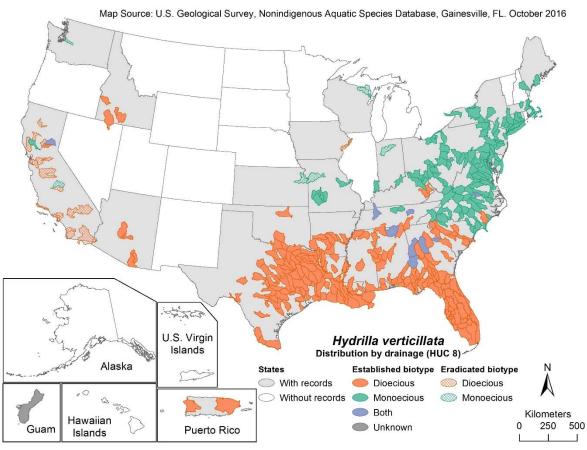
- Assess the state of knowledge of aquatic herbicide application for the management of hydrilla in drinking water reservoirs and its impacts on treatability, water quality and human and environmental health;
- Review lessons-learned from prior hydrilla management efforts;
- Provide an example hydrilla risk assessment to identify potential impacts from hydrilla and management options;
- Provide recommendations for mitigation of impacts associated with hydrilla management; and
- Develop communications resources for public outreach.

By summarizing the state of knowledge, characterizing the range of potential impacts, identifying the considerations for chemical management of hydrilla and documenting the "lessons learned" from water managers, this project can help utilities obtain a better understanding of the potential risks from hydrilla and communicate those risks to stakeholders, so resource managers can respond quickly and effectively to hydrilla infestations.

To achieve these objectives, the project consisted of a literature review of hydrilla management and herbicide research, discussions of hydrilla control experience with resource managers as part of five case studies and organization of an expert workshop to review New York City Department of Environmental Protection's (DEP) hydrilla management options for the New Croton Reservoir. This report is expected to serve as important guidance for drinking water utilities who must be prepared to respond to the threat of hydrilla now and in the future. This project will help utilities combat this detrimental invasive species, while maintaining the health and safety of drinking water supplies.

HYDRILLA NATURAL HISTORY

Hydrilla is a submersed aquatic weed with two known biotypes. The dioecious biotype is thought to have originated from India, while the monoecious biotype can be traced to Korea (Masterson 2007). The introduction of the dioecious strain occurred in two locations in Florida in the late 1950s, in Miami and the Tampa Bay area. The introduction of the monoecious strain occurred in Delaware and Washington D.C. around 1980, as well as in North Carolina (Masterson 2007). Hydrilla was also independently introduced in California (Mulholland-Olson 2004). The aquarium trade is likely the primary cause of the original introduction in all locations.



Source: USGS 2016.

Figure 2 Hydrilla distribution by biotype as of 2016

The dominant biotype of hydrilla in cooler regions of the United States is the monoecious variety, while the dioecious variety thrives in warmer temperatures and is dominant in the southeastern states and Texas (Figure 2). The primary causes of the spread of hydrilla can be attributed to natural local dispersal and reproduction of the plant, unintentional spread of fragments on boats and intentional spread by uninformed individuals looking to increase wildlife and fisheries habitat (Masterson 2007). Spread of hydrilla by animal vectors, such as waterfowl, which transport reproductively viable parts of the plant between waterbodies, is possible but not well-researched (Langeland 1996).

Due to the reproductive nature of the plant and its adaptability to various environmental conditions, hydrilla has been called the "perfect aquatic weed" (Langeland 1996). Hydrilla is adapted to grow in low light conditions allowing it to grow in deeper water than many other aquatic plants. This allows photosynthesis to occur earlier in the day than many of its aquatic competitors, leading to increased growth of up to an inch each day. Hydrilla can survive out of water in moist conditions for several days, which has been an important means of dispersal via boats and trailers. Hydrilla also thrives in varied water quality conditions, both oligotrophic and eutrophic water systems, a wide range of pH, and salinity up to 7% (Langeland 1996). These advantages allow for growth and rooting at greater depths, commonly up to 25 feet or more (Mulholland-Olson 2004). Hydrilla's rapid growth results in dense mats on the water's surface effectively blocking sunlight, making it an aggressive competitor for native species within the US.

Hydrilla is a perennial aquatic plant. The dioecious variety, preferring warmer regions, demonstrates its perennial nature and overwinters. The monoecious variety behaves more like an annual plant, relying on its tuber bank for early spring growth after dying back over the winter (True-Meadows et al. 2016). The primary method of reproduction and spread occurs through the production of tubers, turions, seeds and by fragmentation. Hydrilla stems and fragments can continue to survive, reproduce, and grow roots. Turions, 5-8mm long, are buds capable of forming a new plant. They are located on the leaf axil and will break off and settle on the sediment. Tubers, 5-10mm long, grow on the terminal end of the rhizomes. A single tuber can produce hundreds of plants over the course of a season (Langeland 1996). Hydrilla tuber sprouting includes both synchronous and asynchronous growth patterns. In the Mid-Atlantic states, the tubers of the monoecious biotype typically sprout in late spring and early summer in response to rising temperatures. In the southern states, dioecious biotype tuber germination patterns are more random. Asynchronous sprouting is possible in the monoecious biotype of hydrilla; however, it is less common (Owens et al. 2012).

Tuber banks create challenges for effective management of hydrilla infestations. Once the shoot of the plant is killed, the tuber bank remains. An additional challenge is that tubers can remain dormant for four to six years in dry conditions with the ability to sprout when optimal growth conditions return (True-Meadows et al. 2016). For every square meter of hydrilla, up to 5,000 tubers can be produced (Langeland 1996). The hardiness of the plant leads to difficulties in the management and eradication of infestations from waterbodies. Management of the plant is optimal when the plant is still small and between the period immediately following the tubers sprouting, but before the plants have begun forming new tubers and turions. Effective control measures are required over the course of several years to address the stored reserves within the plant's tuber bank.

_

¹ Synchronous sprouting occurs when most of the plants in a tuber bank sprout at around the same time.

HYDRILLA CONTROL METHODS

There are a variety of control options available for macrophytes (i.e., aquatic plants). The general management categories are physical/mechanical, biological, and chemical. The focus of this project is chemical control methods, but physical/mechanical and biological methods are also included to provide an overview of available management techniques for hydrilla control. The text below summarizes key points for consideration from Wagner (2004) and other resources, but it is not an exhaustive list. Refer to Wagner (2004) for a comprehensive description of the full range of methods for managing macrophytes, and detailed descriptions of advantages and disadvantages. In addition, regulations vary from state to state, so it is recommended that resource managers discuss hydrilla control options with regulators to identify permit requirements and regulatory restrictions that may be specific to their waterbody.

PHYSICAL AND MECHANICAL METHODS

Mechanical and physical control techniques interfere with the plant's life cycle through physical removal or by physically disrupting its habitat. Advantages include targeting control measures to specific sites and no addition of chemicals to the waterbody. Disadvantages include a high risk of spreading hydrilla via fragmentation, near-complete disruption of benthic habitat to fully remove the tuber bank and high costs. The disadvantages typically prevent the use of physical and mechanical methods for large-scale infestations. However, these methods have proven successful for small-scale operations. Listed below are some of the physical and mechanical methods used for hydrilla control and key considerations.

- Benthic barriers entail placement of an anchored mat over the location of the infestation to deprive emergent growth of light. Benthic barriers must be removed annually or cleaned to prevent sediment buildup and rooting on top of the barrier. Barriers can deplete the tuber bank over many years as turions and tubers sprout and die off. The cost and labor involved with installing and replacing barriers limits their cost-effectiveness for large areas.² Further, rocky substrate or areas with substantial debris may be unsuitable for benthic mats. There are a variety of benthic barriers (porous mats, non-porous mats, and sediment) for use under different environmental conditions.
- Dredging is the physical removal of sediment that contains the root structures and tuber bank. Dredging for aquatic plant control has similar impacts as dredging to deepen a river or reservoir. It is a large-scale construction project that includes staging areas, truck routes and sediment dewatering areas. Hydrilla-contaminated sediment cannot be returned to the waterbody and must be disposed of off-site. Dredging results in an immediate impact on benthic biota and submerged vegetation, and bathymetric changes may result in long-term changes to the aquatic environment.
- Mechanical harvesting is the process by which aquatic plants are cut as close to the sediment as possible. Mechanical harvesting is generally considered a short-term management option for hydrilla and will not address the tuber bank. To prevent further

5

² NYC Department of Environmental Protection received an estimate of approximately \$3.00 per square foot for materials and installation at New Croton Reservoir.

- spread of hydrilla, harvested vegetation must be collected to prevent spread by fragmentation or turions.
- Rototilling and hydroraking (Figure 3) are two methods by which the plant and roots are cut and the bottom sediment disturbed to disrupt rooted plant structures. As with harvesting, all plant materials must be collected to prevent further spread.
- Hand pulling is a manual method to remove plants and root material without impacting non-target species. Hand pulling can be effective for small areas, but the labor-intensive method makes it difficult to cover large areas. Further, divers are needed to access plants in water that is more than a few feet deep. As with other removal methods, hydrilla fragments must be collected to prevent spread of the plants.
- Reservoir drawdown requires lowering the water surface elevation to expose aquatic plants and dry them out. To kill the rooted mass, water levels must be left low for an extended period of time, preferably over the winter as prolonged freezing temperatures can kill the rooted mass. However, mild temperatures, snowfall that insulates the soil or groundwater seepage can help protect tubers. Further, it may be difficult to maintain water levels in a state of drawdown for an extended length of time due to water supply operational constraints.



Source: Courtesy of Heather Desko/New Jersey Water Supply Authority.

Figure 3 Hydroraking submersed aquatic plants in the D&R Canal

BIOLOGICAL METHODS

Biological control is based on the concept that a new introduced species that regulates the life cycle of the invasive species can help provide balance to an ecosystem and prevent negative impacts. Research into biological control for hydrilla is on-going, and a number of species have been introduced to date (Harms et al. 2017, IFAS 2017b). The process for identifying and introducing new species is slow, because there needs to be sufficient prior study to ensure the new introduced species will not cause unforeseen impacts. Further, once introduced, many species are not successful. Of the eight species previously introduced in Florida to control hydrilla (Table 1), grass carp (*Ctenopharyngodon idella*) has been the only success. While invertebrates, viruses and fungi are continuing to be researched and tested experimentally for hydrilla control (Harms et al. 2017, IFAS 2017b), grass carp is expected to be the only commercially available biological control method available for hydrilla for the foreseeable future.³

Table 1
Biological control species previously introduced to control hydrilla

Common Name	Scientific Name	Status
Hydrilla tuber weevil	Bagous affinis	Failed to establish
Asian hydrilla leaf-mining fly	Hydrellia pakistanae	Limited control
Australian hydrilla leaf-mining fly	Hydrellia balciunasi	Established in Texas, failed elsewhere
Hydrilla stem borer	Bagous hydrillae	Failed to establish
Hydrilla miner	Cricotopus lebetis	Limited control in Florida
Adventive hydrilla moth	Parapoynx diminutalis	Feeding not limited to hydrilla
Chinese grass carp	Ctenopharyngodon idella	Commercially viable, used in many states including Virginia, Texas, Florida, etc.
Fungal pathogen	Micoleptidiscus terrestris	Limited control

Source: Data from IFAS 2017b

Grass carp preferentially consume hydrilla and are expected to provide control for approximately five years. The level of control is dependent on the ratio of fish to the size of the hydrilla infestation. To achieve eradication or to prevent further spread, sufficient fish must be stocked so that their consumption rate exceeds the growth rate of the plants (Sutton and Vandiver 1986). However, this will result in the fish consuming other aquatic plants as well, potentially impacting native species and altering the lake ecology. Grass carp waste can increase nutrient loads in waterbodies, potentially encouraging algal blooms and further changing lake ecology. Other considerations for grass carp include difficulty in removing them once introduced and potential for grass carp to escape from the target waterbody. Because of the risks associated with grass carp, many states, including New York, New Jersey, and Massachusetts, restrict grass carp to small isolated waterbodies to prevent accidental release into the environment.

³ Grass carp must be US Fish and Wildlife Service (USFWS) certified sterile, triploid fish. (USFWS 2015).

CHEMICAL METHODS

Chemical control methods are commonly used to manage undesirable submerged macrophytes. Chemical control uses herbicides to kill plants, prevent the germination of seeds or to modify the growth of the plants. There are numerous benefits to chemical control methods including predictable performance based on scientific studies and field trials, suitability for large-scale plant management and low risk of hydrilla spread through fragmentation. Disadvantages to chemical control methods include impacts to non-target species, restrictions on waterbody uses following treatment and potential for negative public perception of herbicide treatment.

The goal of chemical treatment for hydrilla is to treat after tubers have sprouted but before plants have begun forming new tubers or turions, which are not directly affected by herbicides. There are two types of herbicides based on their mechanism for influencing plant growth. Contact herbicides act quickly and kill all plant cells that they contact. Systemic herbicides are absorbed and move within the plant to the site of action. The level of control for both types of herbicides is highly dependent on contact time (e.g., level of exposure of the plant to the herbicide) for each specific chemical. As previously mentioned, hydrilla may exhibit synchronous or asynchronous sprouting, which will affect the length and number of treatments required within the growing season.

Discussed below are the most commonly used herbicides known to be effective in controlling hydrilla. It should be noted that these herbicides are nationally registered for aquatic use under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA 1996). Under the provisions of FIFRA, no herbicide may be legally offered for sale, sold, or used in this country without US Environmental Protection Agency (EPA) registration and approval. Herbicides are approved only after the EPA determines that they will perform their intended function without unreasonable adverse effects on the environment. Once approved, every herbicide must bear a "label" containing basic information about the compound, waterbody restrictions, precautionary statements, and directions for proper use. In addition to federal restriction on the use of herbicides, states may also impose their own standards relative to application of these products in their waters. For example, Florida has approved 14 herbicides for aquatic plant control, while New York has approved nine. Only a subset of these are effective against hydrilla and are described below.

As stated previously, there are two biotypes of hydrilla that largely act as different species. The effectiveness of an herbicide varies between the two biotypes, and the regional experience varies. For example, Florida's experience with the dioecious biotype may not be directly applicable to areas managing the monoecious biotype. Information on the effectiveness on each biotype is provided, if available.

The information below provides a summary of the characteristics of herbicide active ingredients that are important to water resource managers addressing hydrilla. However, there may be multiple manufacturers of herbicide products with the same active ingredients with different formulations (e.g., active ingredient concentration, liquid vs pellet form, various other ingredients, etc.). Each product and formulation has its own label and restrictions, as well as advantages/disadvantages that depend on the local conditions of the waterbody (e.g., rate of water exchange, water quality, sensitive species, uses, etc.) and the extent of the hydrilla infestation. Other considerations include the potential to mix two herbicides or the need to add surfactants to increase plant uptake. Each situation is unique, and there are too many considerations to describe them all in this guidance document. It is recommended that water resource managers pursuing chemical control of hydrilla discuss options with state regulators and licensed pesticide applicators

to review the herbicides permitted in their state that will be most effective for the conditions present at their waterbody.

The active ingredients that have been successful in treating dioecious hydrilla include copper complexes, diquat, copper with diquat, endothall, fluridone, imazamox, penoxsulam, bispyribac and flumioxazin (TAMU 2017, IFAS 2017c). The monoecious biotype has been successfully managed to date with diquat, endothall, fluridone and copper (True-Meadows et al. 2016). It should be emphasized that herbicide development is an active area of research, new products may become registered, existing products may prove effective on hydrilla and states may approve herbicides already registered with the EPA. Further, label restrictions may change over time as well. As such, chemical management options should be revisited periodically to identify products that may be better suited for a given application and to update hydrilla management plans with current label information.

The herbicide summary information below is primarily from IFAS (2017c) along with other sources, such as specific herbicide labels. Drinking water restrictions listed below are from the federal label information; state-specific labels may apply additional restrictions. Any application rate information listed is general to provide an order of magnitude reference for comparison with water quality and/or human health standards. Specific application rates should be developed by a licensed pesticide applicator after sufficient review of water quality conditions and usage of a waterbody.

Bispyribac-Sodium

Bispyribac was registered by the EPA for aquatic uses in 2011 and is sold under the trade name Tradewind. Bispyribac is a systemic herbicide that blocks an enzyme necessary for growth and development specific to plants. The biochemical pathway does not occur in animals. As the herbicide accumulates in plant tissue, the plant dies over a period of weeks to months. Bispyribac has been shown to be effective for dioecious hydrilla in field studies (Petta et al. 2012). Tradewind herbicide may be applied to slow moving or quiescent bodies of water where there is minimum or no outflow; it is not applicable in flowing systems. There is no post-application restriction against use of treated water for drinking or recreational purposes (e.g., swimming, fishing) (Valent 2012).

Copper Complexes

Copper is a fast-acting, broad-spectrum, contact herbicide that kills a wide range of aquatic plants and algae. Although copper is a micro-nutrient required by living plants and animals in small amounts, too much copper kills plants by interfering with plant enzymes, enzyme co-factors and plant metabolism in general. Copper has long been used in natural and industrial waters for algae control, often applied directly to water as copper sulfate crystals. Chelated copper (i.e., copper ion combined with an organic molecule) is typically used for aquatic plant management as it remains active in the water column longer than copper sulfate. Copper is toxic to fish, and because copper is an element, it will accumulate in the sediments regardless of its bioavailability. Drinking water considerations are not typically the limiting factor for copper application. National Primary Drinking Water Regulations include an action level for copper at 1.3 mg/L, but copper applied to lakes and reservoirs tends to quickly bind with sediment and organic matter, settling out of the water column (Haughey et al. 2000). Copper can be highly toxic to mollusks and fish at relatively low doses (approximately 1 to 5 ppm), thus some states, (e.g., Florida and New York) restrict its use to prevent impacts to fisheries. Copper alone may only provide fair control of

hydrilla at application rates of approximately 3 ppm. Copper can be added at lower rates in combination with other herbicides (e.g., diquat or endothall) for better control of hydrilla (NCAES 1992).

Diquat

Diquat, first formulated in the mid-1950s, is a fast-acting contact herbicide that is mainly used to control floating plants such as water hyacinth (*Eichhornia crassipes*) and water lettuce (*Pistia stratiotes*). On the immersed portions of plants, diquat acts as a systemic herbicide; it enters and diffuses within the plant. Diquat interferes with photosynthesis by forming highly reactive and toxic free-radicals in plant cells. Diquat kills the exposed portions of plants in 24 to 36 hours. It is water soluble and diffuses rapidly through the water, quickly adsorbing into plant tissue. However, diquat is also strongly cationic, so it adsorbs to and is tightly held by negatively charged clay and sediment particles. For this reason, diquat is ineffective in muddy waters where it will bind to the suspended sediment. Diquat dissipates from the water column by adsorption onto soil particles and has a half-life of 1 to 7 days.

Diquat is relatively ineffective when used alone to control hydrilla, but it can be used in combination with chelated copper for quick control. This may be a good option for small scale occurrences, but not for large scale hydrilla control due to accumulation of copper. Diquat also is used in combination with potassium endothall and flumioxazin herbicides for hydrilla control. In each case, the addition of diquat provides more rapid and perhaps more thorough hydrilla control, while introducing a second mode of action to prevent herbicide resistance.

Diquat is restricted for use in public waterbodies and there is a three-day restriction before water treated with diquat can be used for drinking water purposes. Restrictions are necessary so that water does not contain more than the designated maximum contaminant level goal (MCLG) of 0.02 mg/L (ppm) of diquat dibromide (Syngenta Crop Protection 2009).

Endothall

Endothall acid, first available as an aquatic herbicide in the 1960s, was originally used in agriculture as a plant desiccant. The active ingredient is relatively fast-acting and is formulated into two compounds for aquatic use: a dipotassium salt (potassium endothall) and an monoalkylamine salt (amine endothall). Both compounds are available in liquid and granular formulations. Endothall herbicides interfere with plant respiration and photosynthesis by disrupting plant cell membranes. Endothall breaks down in water microbially with a half-life of approximately 4 to 7 days.

Endothall primarily functions as a contact herbicide, but recent research indicates it acts as a systemic herbicide in hydrilla (Ortiz et al. 2017). Endothall is absorbed by submersed plants in lethal concentrations in 12 to 36 hours depending on the concentration applied.

Potassium endothall at typical application rates of 2 to 3 ppm is not toxic to adult fish, eggs, or fry. Amine endothall is more active on plants, but toxic to fish at concentrations greater than 0.3 ppm. Amine endothall is typically not used alone or for large scale hydrilla control. It is usually applied at very low rates with potassium endothall to increase efficacy and to introduce a second active ingredient to prevent herbicide resistance. Potassium endothall is used extensively in Florida, and the Florida Fish and Wildlife Conservation Commission (FWC) is sponsoring research to develop new uses of the product with other herbicide active ingredients (e.g., bispyribac and penoxsulam).

In quiescent waterbodies, endothall products cannot be applied closer than 600 feet to drinking water intakes. In flowing waterbodies, endothall products cannot be applied such that the concentration exceeds 0.1 ppm, the MCL for endothall. Waters treated with endothall may be used for swimming, fishing and irrigating turf, ornamental plants, and crops immediately after treatment (United Phosphorous, Inc. 2016).

Flumioxazin

Flumioxazin was registered by the EPA in 2011 and is sold under the trade name Clipper. It is a contact herbicide that causes chlorosis (yellowing) and necrosis (browning) of exposed plant tissue. It moves within treated leaves, but does not translocate to other areas of the plant. Plants exposed to flumioxazin die because of the disruption of cell membranes. Once inside the plant cell, flumioxazin inhibits a key enzyme, protoporphyrinogen oxidase. Plant necrosis and death is rapid, taking a few days, up to two weeks. In general, at least four hours of contact time is required for good control.

The primary breakdown pathway of flumioxazin in water is by hydrolysis, and it is highly dependent on water pH. Under high pH values (> 9), flumioxazin half-life in water is 15 to 20 minutes. Under more neutral pH values (7 to 8), half-life in water is approximately 24 hours. Flumioxazin controls a wide variety of submersed and floating aquatic weeds and can be tank-mixed with other contact or systemic herbicides.

There is no post-application restriction against use of treated water for drinking or recreational purposes (e.g., swimming, fishing). Treated water is restricted for use for irrigation for up to five days (Nufarm Americas 2017).

Fluridone

Fluridone is a systemic herbicide, developed in the mid-1970s. It was later shown to be effective for the control of submersed plants and was registered by the EPA for aquatic use in 1986. Fluridone is a systemic herbicide used to control underwater plants and is commonly used for hydrilla control. The herbicide is absorbed by plant shoots and roots, where it moves throughout the plant and interferes with chlorophyll. Without chlorophyll, the plant is unable to photosynthesize, shoot tips turn pink or white, and the plant slowly starves and dies. A plant's susceptibility to fluridone is associated with its uptake and translocation rates (Cornell Cooperative Extension 2016a). Photolysis is the primary degradation mechanism, and the half-life is 20 to 50 days (Netherland 2011). There are two potential toxic degradation byproducts, but there have been no documented detections under field conditions (Wisconsin DNR 2012).⁴

Herbicide Resistance in Hydrilla

Herbicide resistance in hydrilla (both fluridone and endothall) is believed to have occurred from repeated application of a single herbicide over many years that selected for individuals that were less susceptible to the herbicide (Giannotti et al. 2014). Utilizing different herbicides over a season with different modes of action is expected to reduce the possibility of resistance emerging within a population. To date, resistance has only been documented in dioecious hydrilla, but there is no evidence that monoecious hydrilla cannot develop resistance as well (Arias et al. 2005).

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⁴ The toxic metabolites from photolysis of fluridone are N-methyl Formamide and 3-trifluroromethyl benzoic acid. The EPA health risk assessment considered these byproducts, and the fluridone label restrictions account for their potential formation (EPA 2004).

Fluridone is formulated as both a liquid, and as slow or fast-release pellets. Application rates for plant control are much lower than those for other herbicides – in the parts per billion range compared to parts per million. However, contact time is measured in weeks or months rather than hours or days. Fluridone must be kept at prescribed concentrations for at least 45-80 days for optimum long-term control of hydrilla – even longer exposure is required for more mature plants with high carbohydrate reserves. Fluridone application early in the growing season provides the best selectivity for hydrilla control, as hydrilla exhibits robust growth while most non-target native plants are still dormant.

Fluridone resistance has been documented in dioecious hydrilla in Florida, because of asexual reproduction and sole reliance on fluridone for many years (Arias et al. 2005). Repeated fluridone use effectively removed the more susceptible hydrilla genotypes, leaving the more tolerant plants to expand. In Florida pre-application bioassays are used to determine each hydrilla population's current level of fluridone tolerance. Management strategies to prevent the development of resistance include using fluridone in conjunction with another herbicide to avoid inadvertently selecting for resistance.

The maximum application rate for fluridone is 150 ppb, and fluridone application rates are restricted to less than 20 ppb within ¼ mile of potable drinking water intakes (SePRO 2017).

Imazamox

Imazamox was registered for aquatic use in 2007. Imazamox is a systemic herbicide that works by inhibiting the plant enzyme acetolactate synthase (ALS), which regulates the production of amino acids in plants. When ALS is inhibited, plants die. Animals do not produce these enzymes, so imazamox has low toxicity to animals. Enzyme inhibiting herbicides act very slowly. Imazamox is broken down in the water by photolysis and microbial degradation. Its half-life in water is 7 to 14 days.

Imazamox is absorbed rapidly into plant tissues, and growth of susceptible plants is inhibited within a few hours after application, dying in approximately 1-2 weeks. In Florida, aquatic plant management programs include submersed applications for hydrilla control. At concentrations of 50-150 ppb, imazamox acts as a growth regulator for hydrilla, persisting for up to several months. At concentrations of 150-250 ppb, imazamox acts with herbicidal activity, killing hydrilla in a few weeks after application.

Imazamox application rates are restricted to less than 50 ppb within ¼ mile of potable drinking water intakes, and irrigation is restricted at rates above 50 ppb (BASF Corporation 2010).

Penoxsulam

Penoxsulam was registered for aquatic use in 2009. It is currently sold under the trade name of Galleon. It is a systemic herbicide that is applied to plant foliage to control floating or immersed plants, or to the water column for submersed plant control. Penoxsulam works by inhibiting the plant enzyme acetolactate synthase, similar to imazamox. Treatment must maintain herbicide concentrations at sufficient levels for 90-120 days for optimum performance. Penoxsulam is broken down in water both microbially and through photolysis, and its half-life in water is approximately 25 days. Because of the long contact time, penoxsulam is not generally applied in areas of high water exchange. Penoxsulam needs a surfactant for foliar and exposed sediment applications to increase efficacy by binding the herbicide to the plant.

There are no restrictions on consumption of treated water for potable use or by livestock, pets, or other animals. The label for penoxsulam-containing herbicides includes a number of restrictions on irrigation usage after treatment (SePRO 2012).

Topramezone

Topramezone was registered for aquatic use by the EPA in 2013. It is currently sold under the trade name Oasis. It is a systemic herbicide that is applied to the water column for submersed plant control, directly to foliage of floating and emergent vegetation or to dewatered sites. Topramezone is the first herbicide belonging to new chemical class called pyrazolones. In sensitive plant species, topramezone inhibits the enzyme 4-hydroxyphenylpyruvate dioxygenase, leading to a disruption of the synthesis and function of chloroplasts. Consequently, chlorophyll is destroyed by oxidation resulting in bleaching of the growing shoot tissue (white or pink coloration) and subsequent death of the above ground portion of the pant.

Generally, topramezone is applied at 30-50 ppb and maintained at or near the initial concentration for a minimum of 60 days. Applications are made to actively growing plants early in the growing season before mature plants can build tubers. Topramezone is absorbed into the plant tissue and symptoms generally first appear in 7 to 10 days.

Water with concentrations higher than 45 ppb are restricted for potable uses. There are no restrictions on consumption of treated water by livestock, pets, or other animals up to the maximum concentration of 50 ppb. There are no restrictions on use of treated water for recreational purposes including swimming and fishing up to the maximum concentration of 50 ppb (BASF Corporation 2014).

HYDRILLA CONTROL SELECTION CRITERIA

The goals of the hydrilla management program will drive the best approach and will be unique to each individual situation. It is necessary to first explore potential impacts to a waterbody from hydrilla in the event of no action in order to determine management goals. Hydrilla can make use of low light, low nutrient conditions, thus it can outcompete native vegetation and spread to areas native and other non-native vegetation cannot grow. Uncontrolled, hydrilla can be expected to eventually spread to all suitable habitat areas within a waterbody. For example, within the Eno River in North Carolina, while managers were deciding on an appropriate plan of action for hydrilla control, the infestation was able to spread approximately one mile per year within the river (Rob Richardson, personal communication, November 17, 2017).

The large swathes of vegetation and its impact on recreation (fishing, swimming, and boating) have been well-documented and are the typical driver for control in many locations. Other impacts include reducing flow rates in drainage canals and shallow rivers, clogging irrigation intakes and changing flow patterns in cooling water ponds (Langeland 1996). Research has shown that sport fishing species may be negatively impacted once hydrilla reaches approximately 30% coverage (NCAES 1992). A species of cyanobacteria that grows on hydrilla has been linked to waterfowl mortality due to neurotoxin accumulation (Wilde et al. 2005).⁵

Hydrilla's impacts on water quality and treatment operations are a prime consideration for drinking water utilities. Hydrilla dies back in the fall when water becomes cold, causing the

⁵ Toxins produced from cyanobacteria associated with hydrilla are uncharacterized (Dodd et al. 2016). No studies were found that linked hydrilla to direct human health impacts.

vegetation within the water column to die. This can result in impacts to drinking water utilities because 1) the vegetation can block intake screens or collect on treatment plant equipment and 2) the sudden die-off of large stands of hydrilla can cause a large influx of natural organic matter (NOM), as well as causing buildup of NOM within the waterbody over repeated growth/die-off cycles.⁶ NOM is a precursor to regulated disinfection byproducts (DBP), and it is difficult to determine the level DBP formation due to differing types of organic matter reactivity. While no specific studies were identified that evaluated the DBP formation potential of hydrilla, the large volume of biomass hydrilla is capable of producing is sufficient to raise concern.

For waterbodies where the full area is potential hydrilla habitat, typically shallow and slow-moving streams and reservoirs, it is clearly necessary to manage hydrilla actively to prevent it from completely taking over. For waterbodies that could only be partially impacted by hydrilla due to depth or other limiting factors, the amount of potential infestation and the risks to beneficial uses must be weighed against the effort and potential impacts from hydrilla management. Aside from a few exceptions, see Potomac River Case Study, the typical approach has been to actively manage hydrilla to control its spread and reduce the size of the infestation to prevent impacts to native ecology, recreation, fisheries, and other beneficial uses. Further, there must also be a consideration of regional implications when determining the level hydrilla management. For example, if water managers within the larger region are generally following active management, pursuing no action would result in that waterbody becoming a potential source for reintroduction to other waterbodies. Unless compelling information is available that would strongly favor a no action alternative for a waterbody, such as limited potential habitat for hydrilla and low risk of spread to other locations, the general recommendation for drinking water utilities would be to pursue active management to prevent the spread of hydrilla.

- Physical and Mechanical Methods: With the goal of reducing the infestation and preventing the further spread of hydrilla, mechanical methods (dredging, harvesting, hydroraking and rototilling) are not recommended (NCAES 1992). Collecting all fragments, tubers, seeds and turions is too difficult to reliably prevent spreading. Hand removal can be successful for small isolated patches, so long as the fragments are contained. However, hand pulling can be cost prohibitive if the water is deep enough to require divers for the work. Benthic mats are suitable for small areas with good access and suitable substrate, but may not be cost-competitive with herbicides. Reservoir drawdown has proven unsuccessful for hydrilla because the tubers can survive for long periods and remain viable (Langeland 1996). Overall, physical and mechanical methods are not recommended for large-scale control and eradication, but may be appropriate for small scale occurrences.
- Biological Methods: Selection criteria for biological control options, which are currently limited to grass carp, are 1) is it allowable under state law and 2) does the risk from hydrilla outweigh the risks to lake ecology? For example, grass carp have been considered successful in the Catawba River system in North Carolina and South Carolina, but there is little native vegetation in the reservoirs because of water level fluctuations from hydropower operations (Ellis 2014). In waterbodies with diverse aquatic plant communities, grass carp can be expected to diminish native plants, particularly those that are preferred by the species. Because grass carp and other

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⁶ Studies on hydrilla in the Potomac River estimated approximately 15 tons per acre of vegetative matter in shoreline stands in water up to 6 feet deep (US Army Corps of Engineers 1986).

- biological controls are a natural species, performance can be unpredictable. Experience in Washington State, for example, found grass carp performance for aquatic plant management to range from limited control to complete elimination of underwater plants in a waterbody (Washington Department of Ecology 2002).
- Chemical Methods: While there are many effective herbicides available for the management of hydrilla, the primary concern among drinking water utilities with respect to chemical management is their foremost responsibility to maintain public health. For a utility or water manager to decide to add chemicals to a source of drinking water, they must be assured that those chemicals are not going to cause harm to drinking water consumers or the general public. The EPA is charged with setting tolerances and registering pesticides. The EPA has a detailed process for determining the potential for adverse effects from aquatic pesticides based on data and modeling (Stubbs 2014). Human health data required during the registration process include acute toxicity studies, subchronic toxicity testing, chronic toxicity and oncogenicity. Human developmental toxicity is based on gene mutation studies, two generation reproduction studies and structural chromosomal aberration studies. Depending on pesticide use pattern and results of studies, additional studies may be required (Stubbs 2014).

EPA uses the data to conduct a human health risk assessment to evaluate the likelihood that an adverse human health risk may occur because of exposure to a pesticide via direct or indirect contact, or by ingestion of treated foods. Using data and models, EPA determines the potential for exposure from a pesticide and its no adverse effect level (NOAEL), which includes a minimum 100-fold factor of safety (EPA n.d.). In addition to human health studies, general ecological risks are determined based on environmental fate and transport studies and ecological toxicity studies, including analysis of bioaccumulation. The goal of the EPA registration process is to provide assurance that using aquatic pesticides as directed per the label instructions will not cause unreasonable adverse effects on human health or the environment (Stubbs 2014). In addition, recognizing that science changes over time, pesticide re-registration is conducted on an approximately 15-year cycle. Review of the EPA pesticide registration process with an independent toxicologist confirmed the process is both comprehensive and conservative, but is often difficult to properly communicate to the public and other stakeholders (Bernalyn D. McGaughey, Personal Communication, 12/13/17).

Despite the level of effort required to register a pesticide and ensure no adverse effects, there may be apprehension amongst stakeholders at the prospect of their use to manage hydrilla. Therefore, it is typically beneficial to develop a robust public outreach program to provide justification for the need to apply herbicides, get feedback from stakeholders and address their concerns. It is beneficial to provide stakeholders with documentation that demonstrates a low potential for risks and a plan that addresses potential contingencies (e.g., accidents and spills). Given the variety of herbicide characteristics, if chemical management is selected, it is recommended that utility staff consult with a licensed pesticide applicator to review the available products and formulations, state restrictions, presence of sensitive species and location specific conditions to identify the most appropriate product to achieve the utility's goals.

• Combination Methods: Given the persistence of hydrilla and its difficulty to eradicate, typically a combination of measures is often employed to maximize effectiveness. For

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⁷ Tumor-causing

example, when using grass carp with large infestations, applying a contact pesticide is used initially to reduce the plant biomass, decreasing the amount of plant material needed to be consumed by the fish. An additional benefit is that it can improve fish survival, because large hydrilla infestations can cause diurnal swings in dissolved oxygen that could reduce grass carp survival (Sutton and Vandiver 1986). Similarly, a combination of contact and systemic herbicides can provide both immediate and long-term management benefits for hydrilla control. For large-scale infestations, once the bulk of the infestation has been addressed by herbicides and/or grass carp, management strategies could transition to effective small-scale approaches, such as hand pulling or benthic barriers. Typically, there is no single approach that will be fully effective, so it is necessary to keep as many options available to achieve management objectives.

In summary, physical control of hydrilla is generally limited to small infestations that can be managed with hand pulling or benthic barriers. Biological control may be an option depending on state laws and the sensitivity of the aquatic ecology to impacts. Depending on state regulations and local conditions, there may be multiple chemical control options available. Herbicide options should be reviewed with a licensed herbicide applicator to identify the most suitable option based on management objectives and local conditions. In many instances, effective management utilizes a combination of these options to target hydrilla and minimize broader impacts to the waterbody and its beneficial uses. Further, because hydrilla control is a multi-year process, adaptive management that evaluates performance and adjusts the management approach from year to year is often a component of hydrilla control strategies.

HYDRILLA MANAGEMENT CASE STUDIES

Case studies of prior and on-going hydrilla management programs were reviewed to compile lessons learned that would help guide hydrilla management efforts. Refer to Appendix A for select resources on each case study.

CROTON RIVER

Hydrilla was identified in the Croton River, downstream of the New Croton Reservoir and upstream of the Croton Bay of the Hudson River, in Westchester County in 2013 and confirmed in 2014. Following the discovery, the New York State Department of Environmental Conservation (NYSDEC) initiated a review to determine an appropriate management response. The following summarizes the potential risks from hydrilla in the Croton River that were used as justification by NYSDEC to use herbicides to manage hydrilla (McGlynn and Eyres 2017).

- 1) Village of Croton-on-Hudson Drinking Water Supply: The village's drinking water supply consists of groundwater wells with direct connection to the Croton River. Hydrilla could eventually impact water quality from decomposing hydrilla contributing DBP precursors to the village water supply.
- 2) Submerged Aquatic Vegetation (SAV): NYSDEC and other organizations have been working to restore SAV beds throughout the tidal Hudson River, which play a vital role in maintaining river dissolved oxygen levels and providing aquatic habitat in the Estuary. Hydrilla could displace native SAV, negatively impacting restoration efforts.
- 3) Waterfowl and raptors: Although not present in hydrilla samples collected at the Croton River to date, a strain of toxic cyanobacteria has been linked to waterfowl mortality and is associated with hydrilla. The cyanobacteria species is a recent discovery and little is known about its potential to spread north.
- 4) Waters in New York and adjacent states: Given the proximity to numerous waterbodies, its direct connection with the entire Hudson River watershed, ⁸ and state borders nearby, this infestation poses a serious threat to the aesthetic values of many waters in New York, Massachusetts, and Connecticut.
- 5) Fish populations and biodiversity: The dense mats of vegetation will displace native plants, and decomposition of hydrilla vegetation decreases the dissolved oxygen content in the water and can result in fish kills.
- 6) Threat to recreation: The dense mats of vegetation will prohibit swimming, boating, and fishing in infested areas of the river.

Without management existing hydrilla populations would continue to grow and spread to new locations. Each season hydrilla would grow into dense mats that would out-shade and outcompete native plants and then decompose, decreasing dissolved oxygen in the water. The Croton River infestation would be a source of fragments that could establish in the Hudson River, which could be transported to locations where it could become established and grow.

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⁸ An overarching goal of the Croton River hydrilla management program is to prevent the establishment of hydrilla in the Hudson River. The Hudson River watershed is over 12,000 square miles, and it is feared hydrilla could spread throughout much of the state once established in the river.

NYSDEC considered the range of potential management options available for the Croton River. Most physical and mechanical methods were screened out because of the potential for further spread by fragmentation. Benthic mats were reviewed and determined to be largely ineffective in flowing streams. Grass carp were screened out because there would be no way to prevent the fish from escaping into the Hudson River, which could impact native SAV populations. Chemical control was determined to be feasible and effective, and NYSDEC staff recommended chemical control as the preferred option. It was determined that while complete eradication may be difficult to achieve, herbicides could greatly reduce the size of the infestation, enabling continued small-scale maintenance to keep the remaining populations in check. Adaptive management was also adopted as a strategy, which would entail assessing treatment outcomes and revising the approach in subsequent years.

A dye study was conducted to assess the efficacy of herbicide treatment in the flowing stream. It was determined that as long as water exchange was maintained below a maximum threshold, there could be enough contact time before dilution reduced herbicide concentrations. Initially a pilot treatment using endothall (1.5 to 5.0 ppm) for a portion of the river, downstream of the Village of Croton-on-Hudson Drinking Water Supply, was planned for 2016, but never initiated due to permitting delays and unanticipated high flows in the Croton River that exceeded the flow threshold. Fluridone treatment was decided upon for the full length of the river with the first application during the growing season in 2017. Fluridone was selected over endothall, because of the potential drinking water risks to the Croton-on-Hudson wellfield and less potential natural resources impacts. The treatment target concentration was 2 ppb of fluridone. A monitoring plan was developed to achieve multiple goals:

- Drinking water safety,
- Environmental protection, and
- Maintenance of adequate herbicide levels for effective treatment.

Monitoring of the wellfield was conducted daily for the first seven days and then weekly to confirm fluridone levels remained below 1 ppm in the drinking water supply. If wellfield levels reached 1 to 4 ppb in wells, daily sampling would be triggered. If wellfield levels exceeded 4 ppb, fluridone treatment would be modified or terminated until measured concentrations in the wells dropped below the trigger limit. Treatment occurred in July through October 2017. Monitoring increased from weekly to the additional daily sampling due to wellfield levels exceeding 1 ppb in late August. Daily sampling continued for most of the duration of treatment through approximately one month after the end of treatment (NYSDEC 2017c).

Throughout the process, NYSDEC worked with multiple stakeholder organizations in the region to facilitate public outreach, workshops, public meetings, fact sheets and messaging to target audiences that include residents, municipalities, recreationists, yacht clubs, marinas, etc. NYSDEC is planning to hold biannual public stakeholder meetings to provide updates on the project as it progresses. An early summer meeting would outline the plan for the coming season, and an end of year meeting would provide the results of the treatment and monitoring conducted by the contractor. The project webpage on the DEC website will be updated regularly with information from the project and will provide resources for residents, municipalities, and

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⁹ The upstream watershed for the Croton River is 375 square miles. While the New Croton Reservoir regulates flows in the river to some degree, average annual flows can exceed 1,000 cubic feet per second (cfs), and individual storms can result in flows exceeding 10,000 cfs, resulting in large flows over the spillway and into the river.

environmental stakeholders. Annual reports, work plans, water quality monitoring data and survey results will be made available via the project webpage. Overall, the public outreach for the Croton River project has been well-received (Willow Eyres, personal communication, November 17, 2017).

CAYUGA INLET

In the summer of 2011 hydrilla was found infesting 166 acres in the Cayuga Inlet, which drains to Cayuga Lake's southern end in Ithaca, New York. The following provides a summary of the hydrilla management conducted between 2011 and 2015 as described in the annual management reports (Cornell Cooperative Extension 2016a).

Subsequent to the hydrilla discovery, a Hydrilla Task Force was formed to:

- Research the risks posed by hydrilla and the possible responses;
- Collaborate with agencies at all levels of government and other interested parties;
- Provide recommendations to the entities that could carry out actions; and
- Conduct extensive outreach and education in the Cayuga Lake Watershed.

The task force decided on a goal of eradication from the Cayuga Inlet. An herbicide approach was selected, and stakeholders acted quickly to obtain permits in 2011 to conduct an initial herbicide application using endothall-based Aquathol K.¹⁰ The City of Ithaca restricted access to the inlet area during treatment, and water monitoring was conducted in the vicinity until endothall levels were undetectable. Monitoring was also conducted at the Bolton Point water intake (located 2.5 miles north of the Cayuga Inlet) as a precaution. As required by the label, no application was conducted within 600 feet of drinking water intakes.

After the herbicide application permits were obtained, additional hydrilla was identified outside of the treatment areas. Diver-assisted suction harvesting (DASH) was selected to address these areas. Post removal follow up determined that DASH removal was not effective for hydrilla management in the Cayuga Inlet. DASH efforts resulted in considerable hydrilla fragmentation and increased turbidity, increasing the risk of hydrilla spread and creating difficult working conditions for the diver crew. However, the task force still includes hand pulling as one of its options, and plans to continue to use it for small infestations where fragmentation can be prevented.

Prior to the 2012 growing season, researchers and resource managers from across the country with extensive knowledge on hydrilla, along with representatives from herbicide manufacturers, were consulted to provide information to revise the Cayuga Inlet treatment plan. After taking into consideration local site conditions (flow, temperatures, light, water quality, etc.), a dual herbicide approach (endothall and fluridone) was selected. The dual herbicide application was selected to ensure treatment across potential asynchronous hydrilla tuber growth patterns and reduce the risk of developing herbicide resistance. Endothall was applied once, while fluridone was applied as a sustained liquid application, supplemented with the addition of pellets in areas that had low mixing with the main channel. Monitoring was used to manage chemical concentrations throughout the inlet vicinity.

Dual herbicide treatment was continued in 2013, 2014 and 2015 with modifications to treated area as new populations were identified. Additionally, treatment concentrations were refined based on experience from prior year treatments. When hydrilla infestations were

¹⁰ Aquathol K uses potassium endothall, which is less toxic to fish than amine endothall.

discovered outside of treated areas, benthic mats were used to suppress growth and prevent further spread, and the areas wrapped into the treatment area in subsequent years.

Throughout the process, stakeholders conducted substantial outreach to generate support for the hydrilla management plan. Outreach consisted of flyers, website, public meetings, information booths at the farmers market and workshops. Public cruises provided by the Floating Classroom provided a venue for updates on the eradication effort. Members of the task force and other stakeholder organizations (Cayuga Lake Watershed Network and the Cornell Cooperative Extension of Tompkins County) gave media interviews (print, radio, and TV), prepared press releases, responded to individual stakeholder concerns and prepared position statements for regulatory/agency staff and articles for news outlets.

An upcoming consideration will be preventing the spread of hydrilla during channel dredging operations needed for navigation. The plan currently being designed will include the use of geotubes to filter out hydrilla fragments and turions (Cornell Cooperative Extension 2016a).

DELAWARE AND RARITAN CANAL

The Delaware and Raritan Canal (D&R Canal) is a manmade waterway that connects the Delaware and Raritan rivers in New Jersey. The New Jersey Water Supply Authority is responsible for maintaining a dependable supply of water throughout the 60-mile canal. The Authority has nine Canal customers with intakes used for irrigation, drinking water and process water. Nuisance aquatic plant growth inhibits the natural flow of water through the Canal and requires active aquatic plant management. In July 2016, hydrilla was discovered during routine aquatic plant management via mechanical removal. It was decided that the extent of the hydrilla needed to be assessed prior to determining the appropriate management strategies. Submerged aquatic plant mapping was conducted by a consultant in September 2016, which documented hydrilla occurring at over 56% of the sample sites in 18 miles of the Canal. The following provides a summary of hydrilla management approaches as documented in the D&R Canal Submersed Aquatic Vegetation Management Plan (SOLitude Lake Management 2017).

The New Jersey Water Supply Authority determined that rapid expansion of hydrilla and shallow canal depths require management to maintain flows through the canal. The canal is regionally important and could become a source for further spread in New Jersey, where hydrilla is not currently widespread. The New Jersey Water Supply Authority conducted a comprehensive review of physical/mechanical, biological, and chemical options to determine the best approach for the D&R Canal. Table 2 provides a summary of the findings from that review.

In 2017, a team of experts assembled by the New Jersey Water Supply Authority determined that a low dose injection of fluridone was the most effective SAV control method to target hydrilla for the D&R Canal. Many factors were considered during the formulation of the SAV Management Plan, including:

- A review of other large-scale Northeast hydrilla control programs (Cayuga Inlet (New York), Erie Canal (New York), the Croton River (New York), as well as a program in the Eno River (North Carolina)
- A review of water use restrictions for low dose fluridone in the D&R Canal
- Several site visits to the D&R Canal by the consultant and team of experts
- A review of the water flow throughout the D&R Canal

- A rhodamine dye study conducted in April 2017 to simulate the movement of an herbicide throughout the D&R Canal
- Bench tests of herbicide residual removal at all four of the water treatment plants that could potentially pull water from the Canal for potable drinking
- An extensive review of other submerged aquatic plant control programs and their applicability to the D&R Canal

The SAV Management Plan was developed to be adaptive; the results from the prior years' actions reviewed to determine changes to the SAV plan and selected control programs for the following year. The initial treatment plan targeted a rate of 4 ppb at the point of injection, which was planned to flow through the treatment area and maintain concentration in the range of 1.7 to 2.3 ppb. The drinking water intakes are located 11 to 26 miles downstream of the fluridone treatment area. Bench tests were conducted to identify the potential removal efficiencies for processes employed at each drinking water treatment plant. Results of the jar tests were used to develop target concentrations during fluridone treatment and to inform dose alteration in the event that weekly monitoring results indicated fluridone concentrations were too high. Results from the first year of fluridone application indicated that full-scale treatment was found to correlate well with jar test results (Heather Desko, personal communication, 11/17/17).

Table 2
Summary of aquatic plant control options considered for hydrilla in the D&R Canal

Option	Determination for the D&R Canal	Comments
1) Benthic Barriers	Limited Applicability	Possibly viable once size of infestation is significantly reduced
1.a) Porous or loose weave synthetic materials	Limited Applicability	Growth can occur through pores in fabric
1.b) Non-porous or sheet synthetic materials	Limited Applicability	Possibly viable once size of infestation is significantly reduced
1.c) Sediments of a desirable composition	Not Applicable	Applying sediment to cover hydrilla would reduce canal volume
2) Dredging	Limited Applicability	Too expensive for just aquatic plant control
2.a) "Dry" excavation	Not Applicable	Canal cannot be dewatered
2.b) "Wet" excavation	Limited Applicability	Too expensive for just aquatic plant control
2.c) Hydraulic (or pneumatic) removal	Limited Applicability	Too expensive for just aquatic plant control
3) Dyes and Surface Covers	Not Applicable	Flowing water not suitable for dyes
4) Mechanical Removal ("harvesting")	Limited Applicability	Need to manage fragmentation
4.a) Hand pulling	Limited Applicability	Need to manage fragmentation
4.b) Cutting (without collection)	Not Applicable	Not applicable due to fragmentation
4.c) Harvesting (with collection)	Limited Applicability	Need to manage fragmentation
4.d) Rototilling	Not Applicable	Not applicable due to fragmentation

(continued)

Table 2 Continued

Option	Determination for the D&R Canal	Comments
4.e) Hydroraking ¹¹	Applicable	Need to manage fragmentation
5) Water level control	Not Applicable	Not applicable due to flow requirements in canal
5.a) Drawdown	Not Applicable	Not applicable due to flow requirements in canal
5.b) Flooding	Not Applicable	Not applicable due to flow requirements in canal
6) Herbicides	Applicable	Varies by specific herbicide
6.a) Forms of copper	Limited Applicability	Impacts to sensitive trout species
6.b) Forms of diquat	Limited Applicability	Limited experience in the Northeast
6.c) Forms of glyphosate	Not Applicable	Hydrilla not controlled by glyphosate
6.d) Endothall	Applicable	Effective control, but alternative drinking water supply operations require further review
6.e) Fluridone	Applicable	Disadvantages can be managed for effective hydrilla control
6.f) triclopyr	Not Applicable	Hydrilla has low susceptibility
6.g) flumioxazin	Limited Applicability	Better control options available
6.h) Bispyribac-Sodium	Not Applicable	Limited experience in the Northeast
6. j) Imazamox	Not Applicable	Use restrictions are a limiting factor
7) Biological introductions	Not Applicable	Varies by specific organism
7.a) Herbivorous fish	Not Applicable	NJ Dept of Fish and Wildlife will not permit grass carp
7.b) Herbivorous insects	Not Applicable	Not commercially available.
7.c) Fungal/bacterial/ viral pathogens	Not Applicable	Not commercially available.
7.d) Selective plantings	Not Applicable	Would inhibit water flow.

Source: Modified with permission from SOLitude Lake Management 2017, originally based on Wagner 2004.

TONAWANDA CREEK/ERIE CANAL

Hydrilla was identified in an approximately 15-mile section of Tonawanda Creek/Erie Canal near Buffalo, NY in the late summer of 2012. Based on monitoring and delineation during 2013, along with interagency discussions, a plan to conduct herbicide treatment in 2014 was devised (Figure 4). The proximity of the infestation to the Niagara River and the potential for further spread of hydrilla through the canal to numerous key waterbodies across New York and to the Great Lakes were primary factors that drove the decision to initiate the control project.

An important consideration for herbicide treatment in the canal was that during the growth season, when herbicides would need to be applied, typical flow rates are 400 to 800 cubic feet per

¹¹ Hydroraking is the typical method to manage aquatic plant growth and maintain flows through the canal. However, because hydroraking spreads hydrilla, the NJ Water Supply Authority will avoid hydroraking in hydrilla infested areas, unless needed on an emergency basis to maintain canal flows.

second (cfs). Water exchange rates would be too high at these flow rates for adequate herbicide contact time. However, the NYS Canal Corporation was able to reduce flow rates for a period of 48 hours to facilitate treatment operations. Given the short window of time, a fast-acting endothall-based herbicide, Aquathol K, was selected. Drinking water intakes on the Niagara River, downstream of the Tonawanda Creek confluence, were outside of the 600-foot restriction required for endothall application. The treatment plan consisted of treating approximately seven miles of the canal (213 acres) with endothall at a concentration of 1.5 mg/L (ppm). Tuber monitoring operations identified the period between late June to late August as being the optimal time for herbicide application (i.e., after tubers had sprouted but before new tubers had formed). Tuber monitoring also indicated that sprouting was generally synchronous with 90% or more of the tubers sprouting within the mid- to late- summer. This enabled treatment to occur once during the growing season and have a significant effect on the infestation (Netherland et al. n.d.). Large scale treatment has been effective over the past four years, and treatment is shifting to evaluating effective methods for treating isolated patches of hydrilla within the creek/canal (Great Lakes Hydrilla Collaborative 2018).



Source: Kornacki et al. 2014.

Figure 4 Herbicide application in the Erie Canal, North Tonawanda, NY, July 2014

TIDAL POTOMAC RIVER

In the early 1980s, hydrilla had become established and spread across approximately 2,000 acres of shallow area within the tidal freshwater portion of the river. The infestation resulted in navigational difficulties in these areas that prompted the State of Maryland and Commonwealth of Virginia to request the US Army Corps of Engineers (USACE) to conduct an analysis of control options to prevent further spread. A series of planning objectives were developed to guide the plan formulation process. The primary objective was to control existing and future growth of hydrilla in public high use areas (e.g., marinas, major navigation channels, watercraft launch areas and waterfront parks or concentrations of residential development) along the Potomac River. Further, it was a goal to maintain the natural balance of plants in the aquatic environment and encourage

the health of the Potomac River and Chesapeake Bay by minimizing the impact of control operations on native SAV.

The USACE developed an Environmental Impact Statement (EIS) that included consideration of physical/mechanical controls (benthic mats, harvesting, rototilling, dredging and hand pulling), biological controls (grass carp) and chemical controls (diquat, endothall, fluridone and copper complexes). The two preferred alternatives from the analysis were mechanical harvesting and chemical control with diquat (US Army Corps of Engineers 1986). Mechanical harvesting was considered beneficial by providing an immediate removal of vegetation to open river access. It was recognized that mechanical harvesting benefits would be temporary and that the risk of further spread by fragmentation was an issue. Grass carp were ruled out because of impacts to native SAV. At the time endothall and fluridone were not labeled for use in flowing waters, and the toxicity of copper complexes on fish were determined to result in unacceptable impacts to Potomac River fisheries. Diquat was determined to be the only available and effective herbicide for hydrilla control in the Potomac River. However, there was concern that the river flows and tidal movement of water would make it difficult to apply herbicides to target hydrilla and not impact sensitive native SAV.

The USACE ultimately selected mechanical harvesting for implementation and elected to conduct further studies on the effectiveness of diquat on hydrilla in the Potomac River. The USACE has continued to conduct selective mechanical harvesting of hydrilla on a small scale to maintain recreational access in specific areas and has not used herbicides. As expected, hydrilla has continued to spread; however, studies have shown that hydrilla has been a benefit by increasing the SAV coverage in the tidal Potomac River without displacing the native SAV populations (Rybicki and Landwehr 2007).

While there are no drinking water intakes in this section of river, this case study was included as it was the only example identified where large scale hydrilla management was not selected. Unlike reservoirs and smaller rivers or streams, the tidal Potomac River has a watershed of approximately 12,000 square miles and average flows of approximately 9,000 cfs. The depth, flow rates, tidal fluctuation and turbidity are all believed to limit hydrilla habitat across much of this section of river. While hydrilla has extended into a number of the Chesapeake Bay tributaries in Virginia, none of the occurrences were attributed to the presence of hydrilla in the Potomac River.

NEW CROTON RESERVOIR HYDRILLA MANAGEMENT ASSESSMENT

As part of this project, an assessment of hydrilla management options for DEP's New Croton Reservoir is included as a guide for other utilities. The New Croton Reservoir is owned and operated by DEP and is formed by impounding the Croton River. It is the terminal reservoir of the Croton System and receives water from eleven other Croton System reservoirs. The Croton System typically supplies approximately 10 percent of NYC's drinking water demands. However, during drought or other conditions, the Croton System yield is sufficient to meet up to 30 percent of the City's demand. All water diverted from New Croton Reservoir by DEP flows to the Croton Water Filtration Plant (WFP) via the New Croton Aqueduct. Spills and releases from the reservoir continue down the Croton River to the Hudson River.

Located in Westchester County, New York, the reservoir is approximately 22 miles north of New York City. It has a surface area of approximately 2,100 acres, a maximum depth of 120 feet and 19 billion gallons of storage capacity. The reservoir is relatively long and serpentine, stretching for approximately eight miles with 34 miles of shoreline. DEP owns the property surrounding the reservoir and controls access to the reservoir. A permit is required for individuals to fish from the shore or from registered, non-motorized boats, which are required to stay onsite. Swimming is not allowed in the reservoir. The reservoir supports numerous fish species and is popular for recreational fishing. The reservoir supports a warm and cool water fishery with large and small mouth bass, chain pickerel, yellow and white perch, black crappie, bullfish, and sunfish predominating. The reservoir itself is not stocked, but its upstream tributaries are stocked with trout.

The water quality classification for the reservoir is Class AA throughout its entire length, which indicates the highest and best use of the reservoir is for drinking water. DEP operates the only drinking water intakes, one of which is located at the dam and the second is located approximately three miles upstream of the dam. The elevation of the reservoir at full pool is 196 feet above sea level. The reservoir is generally kept within two feet of full pool, except during drought conditions and excessive run-off causing the reservoir to spill. The drinking water intakes are located at the upper release (166 ft. elevation above sea level) and lower release (116 ft. elevation above sea level). In addition to the DEP Croton WFP, the Village of Ossining uses the New Croton Reservoir as its primary source of water for its Indian Brook Water Treatment Plant (WTP). Ossining's intake is a tap off the DEP intake at the dam. New Castle's Millwood WTP has a full backup connection to the New Croton Aqueduct between the reservoir and the Croton WFP. A few other local municipalities (Tarrytown, Sleepy Hollow, Ardsley) may still have connections to New Croton Aqueduct, but cannot currently use them because they are not connected to their respective treatment plants. In addition to direct connections, the Village of Croton-on-Hudson has a wellfield along the Croton River downstream of the New Croton Reservoir.

Treatment processes employed at the Croton WFP include stacked dissolved air floatation and filtration with anthracite/sand dual media filter. The filtered water is then disinfected with UV and chlorine. After treatment, the water is dosed with orthophosphate for corrosion control and hydrofluorosilicic acid to add fluoride. Water flows from the treatment plant to Jerome Park Reservoir prior to entering the distribution system for the City.

DEP's reliance on the Croton System will increase in the next few years as DEP implements a series of construction projects that will take portions of the Catskill and Delaware systems

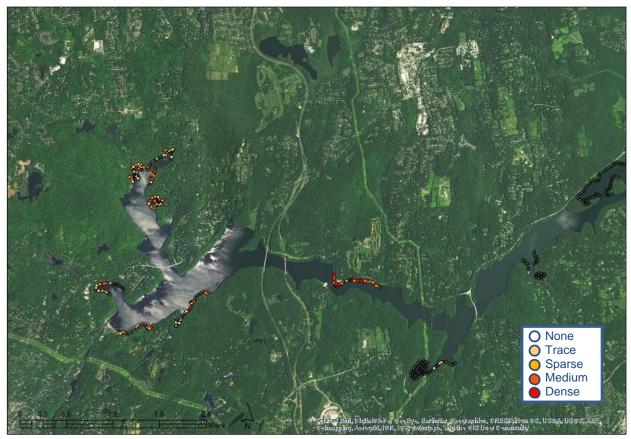
offline.¹² DEP will be shutting down the Catskill Aqueduct for three 10-week periods over a period of 3 years, currently planned for 2018 to 2020. These 10-week shutdowns are required to facilitate the repair and rehabilitation of the Catskill Aqueduct and would generally take place between October and December to coincide with the lowest water demand period of the year. Beginning in October 2022, DEP is planning to shut down the Rondout-West Branch Tunnel, which conveys water to the City from the Delaware System, for a period of eight months to connect a new bypass tunnel. Each of these shutdowns will take a substantial portion of the NYC water supply offline, requiring the Croton WFP to operate up to its maximum rate of 290 mgd. DEP anticipates the Croton WFP will need to remain online continuously, beginning in the spring of 2018 through the completion of the shutdowns in approximately 2023.

The Village of Ossining's Indian Brook WTP uses the New Croton Reservoir for the majority of its water supply. The treatment processes employed at the plant include coagulation, flocculation, dual media filtration, corrosion control and chlorination. The Town of New Castle's Millwood WTP has a backup connection to the New Croton Aqueduct below the reservoir. The Millwood WTP employs coagulation, flocculation, dissolved air flotation, ozone, dual media filtration, corrosion control and chlorination.

After its discovery in the Croton River below the New Croton Reservoir, hydrilla was identified in the reservoir itself in October 2014. The largest infestation is in proximity to a DEP boat launch that is not open to the public. DEP installed small-scale benthic barriers around the boat launch in 2015 and 2016 to limit its spread, while further study was underway. Surveys of the reservoir in 2016 by SOLitude Lake Management revealed populations of hydrilla at a number of locations within the reservoir (Figure 5). Overall, the survey indicated that approximately 33% of the surveyed sites had hydrilla present, ranging from sparse to dense. Preliminary results from a more widespread survey in 2017 indicated the presence of hydrilla in areas not previously surveyed. DEP's primary goal is to protect public health and the environment, which requires protecting the integrity of the water supply system. DEP reviewed the available options and potential risks from hydrilla to formulate a plan to address the hydrilla infestation in New Croton Reservoir.

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¹² The Catskill System typically provides approximately 40 percent of the City's daily water supply, and the Delaware System typically provides approximately 50 percent of the City's daily water supply.



Source: Courtesy of NYCDEP.

Figure 5 New Croton Reservoir hydrilla survey results from 2016

NO ACTION ALTERNATIVE

Based on Secchi depths for New Croton Reservoir, hydrilla could potentially become established in water depths up to 15 to 30 feet (Hoyer and Canfield 1997). While much of the reservoir is deeper, approximately 400 to 1200 acres (19 to 55%) of reservoir surface area has depths within this range. Without management, as described previously, hydrilla can be expected to colonize a large portion of the reservoir. Water supply impacts from an extensive hydrilla infestation in New Croton Reservoir will consist of increased NOM and potential spikes in disinfection byproducts annually when the plants die back. Sufficient vegetation may enter the intake to clog screens and treatment plant equipment. Natural resources impacts would be anticipated to include a reduction in fish biomass over time (Langeland 1996).

Perhaps of greatest concern is that, without action, the hydrilla infestation at New Croton Reservoir would become a source of spread and re-infestation across the region. At highest risk is the downstream Croton River, which would receive the bulk of hydrilla fragments each year. This influx of viable fragments would severely impact current management efforts to remove hydrilla from the Croton River to prevent further spread into the Hudson River downstream. The upstream Muscoot Reservoir would also be at high risk. Muscoot Reservoir is immediately upstream of New Croton Reservoir and is only separated by a low dam that is often submerged (Figure 6). ¹³ Unlike

¹³ While the predominant flow path is downstream, winds can push water upstream, facilitating the spread of floating fragments.

New Croton Reservoir, Muscoot reservoir is shallow with a maximum depth of 30 feet. Once established in Muscoot Reservoir, hydrilla could potentially colonize nearly 100% of the reservoir surface area. All water from the Croton System must flow through Muscoot Reservoir to be available to DEP for water supply. A substantial hydrilla infestation in Muscoot Reservoir could obstruct flows through the reservoir, resulting in water supply problems for DEP. Uncontrolled, hydrilla would be expected to continue to spread through the Croton System, compounding water supply and ecological impacts in the watershed. While not in the same watersheds, New Croton Reservoir is less than ten miles from Kensico Reservoir, the terminal reservoir for the unfiltered Catskill and Delaware systems. Impacts to the NYC water supply system from hydrilla infestation in Kensico Reservoir would be more severe because the system typically provides 90% of the City's supply and is unfiltered, limiting control options for water quality impacts. Possible routes for the movement of hydrilla from the Croton System to Kensico Reservoir include accidental spread by recreational users, waterfowl vectors and system interconnections. ¹⁴ In conclusion, there are substantial risks to the water supply system from hydrilla in New Croton Reservoir. Impacts to the water supply system and its many regional benefits will only grow as the infestation continues to spread.



Source: NYCDEP 2018. Figure 6 Muscoot Dam

PHYSICAL, MECHANICAL, AND BIOLOGICAL CONTROL OPTIONS

Because of the risk of spreading via fragmentation, mechanical methods for hydrilla control are not viable. Reservoir drawdown conducted at other reservoirs has been shown to be ineffective

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¹⁴ Delaware System diversions mix with water in the Croton System West Branch Reservoir under certain operational conditions, and there are interconnections between the Croton System and the Delaware Aqueduct at Croton Falls and Cross River reservoirs that are used in emergency situations.

for hydrilla, and long-term drawdown in New Croton Reservoir needed for hydrilla control is infeasible.¹⁵ Biological control with grass carp at New Croton Reservoir is not allowable by state regulators, and is was not an option (NYSDEC 2017b). Given the large-scale extent of hydrilla in New Croton Reservoir, benthic barriers and hand pulling would be cost-prohibitive across the full extent of the infestation. Once the majority of the hydrilla infestation has been eradicated, benthic barriers and hand pulling may prove effective for managing hydrilla long-term, but the current infestation is too extensive for these measures to be feasible and cost-effective.

HERBICIDES AVAILABLE FOR HYDRILLA CONTROL APPLICATIONS IN NEW YORK

There are numerous potential herbicide options available for aquatic plant management in New York. While EPA has the authority to register pesticides and set application restrictions, NYSDEC is responsible for permitting pesticide use within the state. In New York State, most projects or activities proposed by a state agency or unit of local government, and all discretionary approvals (permits) from a NYS agency, require an environmental review under the State Environmental Quality Review Act (SEQRA) to determine if an environmental impact assessment (EIS) is required. A Generic Environmental Impact Statement on Aquatic Vegetation Management (GEIS) was completed in 1981 satisfying EIS requirements for the issuance of Article 15 Aquatic Pesticide Permits for all the aquatic herbicide active ingredients registered for use in waters of the State at the time. Supplemental Environmental Impact Statements (SEIS) were subsequently submitted for additional herbicides. Currently, the following herbicides are allowed for aquatic applications in New York: 2,4-D, copper sulfate, diquat, endothall, fluridone, glyphosate, hydrogen peroxide, imazamox and triclopyr. The text below summarizes screening for applicability of each herbicide for New Croton Reservoir.

- 2,4-D Blackburn and Weldon (1970) found 2,4-D to have limited effectiveness for hydrilla control and (IFAS 2017a) listed 2,4-D control of hydrilla as variable. However, both resources are related to dioecious hydrilla, no documentation of treatment for monoecious hydrilla was identified. 2,4-D was removed from further consideration due to limited information on the effectiveness for monoecious hydrilla.
- Copper complexes Previously used for monoecious hydrilla (True-Meadows et al. 2016). Copper can be used either by itself or as a mixture with diquat or endothall. However, application rates may be too high for hydrilla control, because the maximum application rate for copper is 200 ppb in class AA waters per 6 NYCRR 703.5 (NYCRR n.d.) surface water quality standards. Copper complexes were removed from further consideration due to limited effectiveness for hydrilla at maximum allowable rates in New York.
- Diquat Previously used for monoecious hydrilla (True-Meadows et al. 2016). However, not effective by itself, must be mixed with either endothall or copper. Max application rate of diquat is 20 ppb per 6 NYCRR 703.5 surface water quality standards. Label restrictions require no use for drinking water for three days following treatment

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¹⁵ The upstream watershed is approximately 375 square miles. While DEP has control over releases, there is no bypass around the reservoir, so there would be no way to maintain the reservoir in a drawdown state under typical hydrologic conditions.

- and there is a MCL of 20 ppb for drinking water. Diquat removed from further consideration due to restrictions on use in sources of drinking water.
- Endothall Previously used for monoecious hydrilla (True-Meadows et al. 2016) and has a precedent for use in New York in Erie Canal and Cayuga Inlet. Endothall products cannot be applied within 600 feet of drinking water intakes and there is a drinking water MCL of 0.1 ppm (100 ppb).
- Fluridone Previously used for monoecious hydrilla (True-Meadows et al. 2016) and has a precedent for use in New York in Croton River and Cayuga Inlet. Fluridone application rates are restricted to less than 20 ppb within ¼ mile of potable drinking water intakes.
- Glyphosate Glyphosate is not recommended for hydrilla (Wagner 2004) and is removed from further consideration.
- Hydrogen peroxide Hydrogen peroxide is only approved for use as a fungicide and algaecide in New York per the SEIS and is removed from further consideration.
- Imazamox There are limited studies on the effectiveness of imazamox on monoecious hydrilla. Getsinger et al. (2011) found good control of monoecious hydrilla at application rates up to 200 ppb at one to three months after treatment, but recommended additional studies to confirm observations and evaluate improvements from mixing imazamox with a contact herbicide. Label restrictions on imazamox limit application rates to less than 50 ppb within ¼ mile of potable drinking water intakes. Imazamox removed from further consideration due to limited information on the effectiveness for monoecious hydrilla and restrictions on use in sources of drinking water.
- Triclopyr Few sources of information were identified indicating triclopyr for hydrilla management. The SEIS for triclopyr indicates it provides a medium level of control for hydrilla, but there was no distinction made for biotype. Label restrictions for triclopyr limit concentrations to less than 50 ppb within ½ mile of drinking water intakes. Triclopyr removed from further consideration due to limited information on the effectiveness for monoecious hydrilla and restrictions on use in sources of drinking water.

Based on the combination of regulatory constraints in New York and documented herbicide effectiveness for monoecious hydrilla, endothall- and fluridone-based herbicides appear to be the best available options for chemical control of hydrilla in New York for sources of drinking water. There may be specific instances that might favor other options, such as low-level copper or diquat with endothall, but these formulations require consultation with a licensed herbicide applicator. Further, aquatic herbicide development is an active area of research, and additional information may become available over time that eases current restrictions or demonstrates increased effectiveness for available herbicides. As described previously, there are a number of other herbicides approved by EPA, but not currently allowed in New York and/or with limited testing on monoecious hydrilla. These options may become available to DEP in the future, at which time should be considered to determine their potential efficacy for New Croton Reservoir.

A detailed comparison of the two available options for New Croton Reservoir is provided below.

Endothall

Two types of endothall are available, potassium and amine. The potassium endothall, sold as Aquathol K, is considered for New Croton Reservoir because of its prior use in New York for hydrilla control and lower toxicity to fish and aquatic invertebrates as compared to amine endothall (Wisconsin DNR 2012). Typical application rates referenced in literature for hydrilla control range from 1.5 to 5.0 ppm. Endothall is fast-acting, for example contact time at 1.5 ppm for the Erie Canal treatment was 48 hours. Endothall breaks down by microbial degradation and is faster in warmer conditions and slower in cooler conditions. The half-life averages five to ten days, with complete degradation within 30 to 60 days (Wisconsin DNR 2012). Endothall is effective on plants with one treatment per season, unless sprouting occurs again later in the season, in which a second treatment is needed to address the second round of tuber sprouting during the growing season.

Endothall cannot be applied within 600 feet of active drinking water intakes due to the EPA MCL of 0.1 ppm. Therefore, the Croton intake would need to be shut down, or a second herbicide employed, to address infestations around the intake locations. These precautions should be sufficient to protect drinking water quality, but to provide a treatment barrier for endothall, DEP would need granular activated carbon, which has been identified as the best available treatment technology (EPA 2009). Chamberlain et al. (2011) found the degradation potential of endothall to be low (less than 20%) for typical water treatment oxidation chemicals (free chlorine, monochloramine, chlorine dioxide, hydrogen peroxide, ozone, and permanganate) and UV treatment.

While there are risks from inhalation and dermal contact, from a drinking water perspective, the 2015 EPA Human Health Risk Assessment for endothall (EPA 2015) determined the following:

- Acute toxicity is low for ingestion;
- Endothall is classified as "not likely to be carcinogenic to humans;"
- It has no mutagenic potential; and
- There is no evidence of neurotoxicity, developmental or reproductive toxicity.

The primary effect from ingestion is the formation of stomach lesions. The short-term/chronic oral NOAEL was listed as 9.4 mg/kg/day (EPA 2015). At the MCL of 0.1 ppm, it would require a daily intake of 5,600 liters of water for an adult and nearly 1,000 liters of water for a child to reach the NOAEL. Typical daily drinking water intake is one to four liters, resulting in a factor of safety of approximately 1,000 or more for endothall ingestion from drinking water.

The ecological toxicology impacts have been reviewed by the Washington State Department of Ecology as part of its Final Impact Assessment. The findings from that study indicated endothall would not affect aquatic biota acutely or chronically when applied at concentrations less than 5.0 mg dipotassium endothall salt/L recommended on the label.

Fluridone

Typical application rates for hydrilla treatment with fluridone range from 2 to 4 ppb, which is well below the label limit of 20 ppb within ¼ mile of drinking water intakes and the NYS MCL of 50 ppb. While much lower than endothall, treatment must be maintained for much of the growing season (45 to 80 days) to get sufficient contact time for effective control. Additionally, the degradation of fluridone is slower with a half-life of 20 to 50 days.

The 2004 EPA Health Risk Assessment for Fluridone (EPA 2004) determined the following:

- The acute toxicity of fluridone is moderate to low;
- Fluridone was negative for inducing mutations in all guideline studies of the standard mutagenicity tests;
- No neurotoxicity was reported in any of the studies; and
- Fluridone did not significantly affect any of the reproductive parameters.

The drinking water NOAEL was listed as 15 mg/kg/day for short/intermediate term and chronic exposure (EPA 2004). At a treatment level of 4 ppb, it would require a daily intake of 225,000 liters of water for an adult and over 35,000 liters of water for a child to reach the NOAEL. Typical daily drinking water intake is one to four liters, resulting in a factor of safety of approximately 35,000 to 50,000 or more for fluridone ingestion from drinking water. Further, the fluridone SEIS conducted for registration in New York found no adverse public health impacts from fluridone application at rates less than 50 ppb.

Fluridone does not have an established best available treatment technology. Further, little to no specific data was identified in the literature that determined treatment efficacy for typical water treatment processes. The following provides a brief overview of the potential for removal of fluridone from water based on available literature.

Chlorine Disinfection

No studies were identified that assessed chlorine treatment of fluridone. Croton River monitoring in 2017 detected fluridone in some of the Croton-on-Hudson wells at a concentration of 1 to 1.4 ppb, but measured reduced levels of 0.4 to 0.8 ppb in the distribution system (NYSDEC 2017c). The village only treats the well water with chlorine (Croton-on-Hudson 2017). While these results indicate there could be some fluridone degradation by reaction with chlorine, there could be other factors that affected the fluridone concentrations.

Other Oxidants

Chamberlain et al. (2011) evaluated the degradation potential of 62 pesticides and herbicides from typical water treatment oxidation chemicals (free chlorine, monochloramine, chlorine dioxide, hydrogen peroxide, ozone, and permanganate). While fluridone was not included, the majority of the pesticides evaluated in the study exhibited low (less than 20%) removal. However, some pesticides did experience medium (20% to 50%) or high (greater than 50%) removal for various oxidants. There were no clear trends in the data, but ozone (O₃) tended to provide better removal for many, but not all compounds. Based on the variation of removal efficacy between different pesticides and oxidants, additional study is needed to identify the specific reactivity of fluridone to water treatment oxidants.

Advanced Oxidation Processes (AOP)

AOP is a set of processes designed to oxidize organic compounds through the creation of hydroxyl radicals. No information was identified in the literature search related to the effectiveness of AOP on fluridone.

Ultraviolet Light (UV)

No studies were identified that assessed UV treatment of fluridone in a drinking water treatment context. However, photolysis is the primary mode of degradation of fluridone. Mossler et al. (1989) determined the change in half-life of fluridone due to different wavelengths of UV radiation and found that wavelengths in the range of 297 to 325 nm had more rapid degradation than wavelengths above approximately 350 nm.

The Croton UV system is designed for disinfection to target *Giardia*. The UV reactors are low-pressure high-output (LPHO) and operate at a wavelength of 254 nm. Prior studies indicate fluridone photolysis occurs at the UV B range of 280 to 315 nm, which is outside the range of the Croton UV system. Additionally, the exposure time in the UV facility is on the order of seconds, not hours needed per Mossler et al. (1989). Without further information, no treatment can be assumed for fluridone from UV disinfection systems.

Granular Activated Carbon

Activated carbon can bind with herbicides (Sun et al. 2011). However, no studies were identified that quantified removal rates using commercially available granular and powdered activated carbons used in water treatment plants. The utilities that use the D&R Canal as a source of supply conducted jar tests to simulate fluridone removal during typical treatment processes. Further, the plants monitored fluridone at their intakes and following treatment during the fluridone application in the canal during 2017. As is typical with activated carbon treatment of synthetic organics, the level of removal varies based on type of carbon, dosage rate, contact time, background water quality and other factors. Results have not been published, but, as stated previously, full-scale treatment was found to correlate well with jar test results for the utilities using the D&R Canal as a source of supply (Heather Desko, personal communication, 11/17/17).

Sedimentation, Flocculation, Filtration

The organic carbon partition coefficient (Koc) for fluridone is 260 to 740 cm³/gm (EPA 2004), which is indicative of low to moderate soil adsorption (NCBI 2017). Some removal of fluridone, therefore, may occur in turbid waters as particles are removed from the water column via sedimentation, flocculation, and filtration.

Aeration

Volatilization from water surfaces is not expected to be an important fate process based upon estimated Henry's Law constant for fluridone (NCBI 2017).

Ozone with Biologically Active Filtration

Ozone with biologically active filtration (O₃/BAF) uses ozone to break down organic matter and has a granular filter that is primed with living organisms to consume organic matter. Activated carbon is a typical media for O₃/BAF. There is no data available as to the effect of ozone on fluridone. Further, it is difficult to determine whether the O₃/BAF microorganisms would acclimate to fluridone as a source of carbon over time. The activated carbon filter bed is not expected to provide substantial removal, as it is not optimized for synthetic organic removal in

O₃/BAF. Unless O₃ is determined to be reactive with fluridone, O₃/BAF is not expected to achieve any greater removal than that of a typical granular media filter.

Impacts

From an ecological toxicology perspective, a number of independent toxicological assessments have ranked fluridone as being relatively low risk when following label instructions (ENSR International 2005; Durkin 2008). Wagner et al. (2017) reviewed the impacts of low dose fluridone treatment across 64 lakes over 20 years of treatment for Eurasian Watermilfoil. The findings indicated short-term impacts on non-target aquatic plants and aquatic plant species richness, but that most species recovered within one or two years. The fluridone SEIS conducted for registration in New York determined no adverse impacts based on label application rates. The California Division of Boating and Waterways (CADBW) uses fluridone to control invasive aquatic plants in the Sacramento-San Joaquin Delta, which is home to numerous threatened and endangered fish species. CADBW develops environmental impact reports of its submersed aquatic invasive species control program approximately every five years (CADBW 2012). The plans are reviewed for concurrence by the USFWS and National Marine Fisheries Service to ensure no impacts to threatened and endangered species or critical habitat (Jeff Caudill, personal communication, 11/13/17).

NEW CROTON RESERVOIR HYDRILLA WORKSHOP

In addition to the review in this report, a workshop was held on November 17, 2017 with outside experts and case study representatives to review the options under consideration for hydrilla control by DEP and identify potential risks to the water supply system from hydrilla and hydrilla management. DEP had preliminarily selected fluridone as the preferred option for treatment of the New Croton Reservoir due to the lesser restrictions on application near drinking water intakes and to be consistent with the treatment determined by NYSDEC for the Croton River. As such, there was a focus on fluridone application for hydrilla control, fluridone fate and transport and fluridone removal. However, the advantages and disadvantages of other herbicides as well as physical, mechanical, and biological control methods were also discussed.

The workshop included variety of professionals with expertise relevant to managing hydrilla in New York and nationwide (Table 3). The range of expertise enabled the group to broadly explore the important considerations for a hydrilla management program. The goal of the workshop was to collect information for DEP decision-making, and the group was not charged with making recommendations. It was decided the project team would distill recommendations for DEP from workshop discussions as detailed below. This was decided beforehand to maximize the limited workshop time available and to enable the participation of industry experts without creating a conflict of interest. Refer to Appendix C for all workshop materials, including agenda, participant bios, background material, etc., and refer to Appendix D for workshop presentations. The discussions and information shared during the course of the workshop have been integrated into this report. Refer to Appendix E for a summary of the workshop discussions.

¹⁶ A number of people with herbicide toxicology expertise were invited to the workshop, but the schedule of the meeting did not enable them to attend. The project team reached out to them separately to discuss the EPA human health risk assessment process and prior experience with human and ecological toxicology of fluridone.

Table 3
Workshop participants

Case Study Representatives	vorksnop participants		
Heather Desko	New Jersey Water Supply Authority		
Mike Greer	US Army Corp of Engineers		
Angel Hinickle	Tompkins County Soil and Water Conservation District		
Cathy McGlynn	NYSDEC Invasive Species Coordination Unit		
Outside Experts			
Rob Richardson	NC State University Dept of Crop Science		
Dave Mitchell	Independent Lake Management Consultant		
Industry Representatives			
Chris Doyle	SOLitude Lake Management		
Mark Heilman	SePRO		
Regulator Representatives			
Anthony Lamanno	NYSDEC Bureau of Pest Management		
Utility Operations and Treatment E			
Linda Diebolt	Hazen and Sawyer		
Matt Valade	Hazen and Sawyer		
Josh Weiss	Hazen and Sawyer		
Facilitators	Title in the sum yet		
Ben Wright	Hazen and Sawyer		
Heather Landis	Hazen and Sawyer		
Tina Nelson	Hazen and Sawyer		
Water Research Foundation Staff			
Alice Fulmer	Water Research Foundation		
Jennifer Warner	Water Research Foundation		
Water Research Foundation Project Advisory Committee			
Willow Eyres	NYSDEC		
Orren Schneider	American Water		
Meredith Taylor	NYC DEP		
DEP Staff			
Mike Usai	NYC DEP		
Dale Borchert	NYC DEP		
Ira Stern	NYC DEP		
Paul Lenz	NYC DEP		
Adam Bosch	NYC DEP		
Jim Keesler	NYC DEP (by phone)		
Lori Emery	NYC DEP (by phone)		

RECOMMENDATIONS FOR DEP

The first documented case of hydrilla in New York was in 2008, and it has since spread to 11 counties in less than ten years (NYSDEC 2017a). Without management, hydrilla is expected to continue to spread through the state. Given the need to control the spread of hydrilla in New Croton Reservoir and the lack of effective non-chemical options available for managing a large-scale infestation, herbicide treatment is the only available option to DEP. At this time, only two herbicide options appear feasible for the New Croton Reservoir: endothall and fluridone. Based on available data from EPA and from independent risk assessments for fluridone and endothall, when following label restrictions, herbicide treatment of hydrilla in New Croton Reservoir would likely be effective and feasible without resulting in significant adverse impacts to human or ecological health.

Both options have advantages and disadvantages. Additionally, activated carbon is the only confirmed treatment process that would provide a treatment barrier for the removal of either herbicide, but no WTP that uses New Croton Reservoir as a source of drinking water has activated carbon as part of its plant.¹⁷ However, appropriate application of either herbicide could be conducted so as not to require drinking water treatment to maintain compliance with regulations. Further, while dilution and natural degradation will reduce the concentration of either herbicide, the application plan and monitoring should be coordinated with NYSDEC to ensure no adverse impacts on herbicide application in the Croton River downstream.

Below is a discussion of the considerations of the two herbicide options for New Croton Reservoir.

- Endothall The shorter treatment period and quicker degradation is a major advantage for endothall. However, endothall application would require intake shutdown to apply herbicides within 600 feet of the intakes. DEP has limited ability near-term to shut down the intakes given upcoming repair activities in other parts of the water supply system. Impacts to other systems that rely on New Croton Reservoir would also need to be taken into consideration. If DEP cannot reliably plan around endothall application in the reservoir to allow for herbicide contact time and subsequent degradation, it is not recommended that DEP pursue endothall for treatment in proximity to the drinking water intakes. However, endothall treatment of areas outside of the 600-foot intake buffer is not expected to result in adverse impacts. Because it took nearly six to eight weeks for fluridone to show up in the Croton-on-Hudson wellfield during Croton River fluridone application (NYSDEC 2017c), endothall would not be expected to impact the downstream wells following a 24 to 48 hour treatment of the reservoir.
- Fluridone Fluridone application would allow for continuous operation of the intakes, regardless of application location, because of the lack of drinking water restrictions at the dosages allowed in New York. The long-duration treatment is a disadvantage because it increases the potential the herbicide could eventually enter the intake. While this would not be a public health concern at the concentrations needed to control hydrilla, it could result in negative public perception. It should be noted that treatment would occur when the reservoir is typically stratified. Stratification reduces vertical mixing of the reservoir, which would make it unlikely for fluridone to mix with deeper

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¹⁷ The Croton WTP was designed to be able to convert to GAC in the future. Indian Brook WTP is currently being upgraded and may have the same option in the future.

water at the elevation of the intakes. However, stratification cannot be relied upon to prevent fluridone from reaching the intake. Large storms can mix the reservoir vertically, and large drawdown conditions, such as during droughts or the RWBT shutdown, can drop the thermocline below the intake level.

Given the operational constraints on the reservoir, fluridone is the best available herbicide for treatment in proximity to the intakes. Either fluridone or endothall could be used elsewhere in the reservoir. If DEP pursues herbicide treatment of New Croton Reservoir, it is recommended that DEP develop a comprehensive public outreach program to educate the public on the need for treatment and risks of hydrilla to justify the use of herbicides in New Croton Reservoir. The public outreach program for herbicide treatment should address the potential for minor exposure, and put the level of incidental exposure in context with the EPA-derived NOAEL.

The health of the reservoirs is critical for DEP to manage water quality and maintain recreational opportunities. Invasive species are a recognized threat, and DEP has enacted strict rules and regulations to prevent the introduction and spread of invasive species. For example, DEP requires all recreational users to obtain an access permit, and all boats used on DEP property are required to be registered, inspected and steam cleaned by DEP. Boats must be stored on-site and transfer between reservoirs is not allowed without a new permit and cleaning/inspection (NYCDEP 2010). While it may be possible for boaters to spread hydrilla within the reservoir, DEP only allows non-motorized boats, which greatly reduces the ability of boaters to traverse great distances in the reservoir. Aside from natural movement of hydrilla fragments on the currents, DEP's New Croton Reservoir access restrictions are expected to prevent further spread of hydrilla both within/outside of the reservoir.

INVASIVE SPECIES CONTROL AND SOURCE WATER PROTECTION

Source water protection (SWP) is an established component of the multi-barrier approach to protecting the health and safety of public drinking water supplies. While invasive species may not result in acute water quality impacts the same as other threats (e.g., chemical spills, wastewater discharges, non-point source pollution, etc.), they do result in a range of impacts to water supplies that must be addressed by utilities. Managing invasive species consumes staff time and budget, increasing costs and taking away from other pressing water supply needs. Therefore, invasive species management can be included as part of a utility's SWP planning efforts, giving decision-makers a roadmap for engaging with the public and other stakeholders on this important issue.

There are a range of resources on SWP and community engagement from the EPA, AWWA, Water Research Foundation and state agencies. These resources are directly applicable to invasive species. The American Water Works Association (AWWA) management standard G300-14, for example, describes the generally recognized elements of an effective SWP protection plan.

- 1. Source water protection program vision stakeholder involvement;
- 2. Source water characterization;
- 3. Source water protection goals;
- 4. Source water protection action plan;
- 5. Implementation of the action plan; and
- 6. Periodic evaluation and revision of the entire program.

These components of a SWP plan can be used both for preventive measures and active management of invasive species. The following describes some of the additional considerations when applying these concepts to invasive species.

- Source water protection program vision The visioning process is an important first step in the SWP process. The vision is a statement of commitment and provides the over-arching guidance for setting priorities into the future. Depending on the level of detail in the vision statement(s), invasive species can specifically be addressed or simply referenced under the umbrella of threats to the water supply/watershed.
- Stakeholder involvement This step recognizes the types of stakeholders (drinking water consumers, recreational users, governments, community groups, commercial interests, etc.), their interests in source protection and their ability to affect change (good and bad) in the watershed. It is critical to identify recreational users' potential role in spreading aquatic invasive species, and include them as a primary target for outreach. Through education, recreational users can become strong advocates for the water supply. The stakeholder group may also be expanded to include adjacent watershed managers in order to develop regional cooperation for preventing the spread of invasive species. Utilities can use the same public outreach toolbox developed for general source water protection efforts to engage with the community on both prevention and management actions. Options available provide for a range of outreach options that can be used singularly or in combination.
 - o Passive outreach (flyers, signage, etc.)

- o Public review/comment of management plan
- o Public meetings to solicit comments
- o Direct engagement of organizations/governments
- o Steering committee with stakeholder participation

The goal of public engagement is to integrate the community into the planning process. While it takes effort, in the long term it will save time and help cultivate success, particularly with potentially contentious issues, such as herbicides in sources of drinking water. Appendix B includes a list of frequently asked questions on hydrilla management to help utilities develop communications resources for stakeholder engagement.

- Source water characterization Unlike typical sources of contamination, because
 invasive species can travel between watersheds, it is useful to expand the range of
 watershed characterization to include nearby invasive species occurrences that are
 outside of the watershed. Understanding the modes of travel, vectors and waterbody
 access will help characterize the risks from nearby occurrences.
- Source water protection goals Building off the source water characterization, utility managers may have different goals for different species. By ranking species based on important criteria, utilities can focus prevention and management efforts on high risk/high cost species (e.g., hydrilla and zebra mussels).
- Source water protection action plan, implementation, and periodic revision These steps are consistent with the typical SWP process when applied to invasive species, and are critical for turning goals into defined action items that are re-evaluated based on the level of success over time.

CONCLUSIONS

Hydrilla is a high priority risk for river and reservoir systems as it can impact water quality, aquatic habitat, and recreational uses. The dense mats formed by hydrilla are a hazard for boats and swimmers, as well as shading out native species. Decay of plant litter can increase natural organic matter in reservoirs, cause fish kills from low dissolved oxygen, impede flows through streams and channels and clog intake structures.

Herbicides have been effectively used to manage hydrilla in waterbodies across the US. However, the decision to apply herbicides in sources of drinking water, even to control a highly invasive plant such as hydrilla, is not taken lightly. Because the primary objective of the drinking water sector is protecting public health, utilities and the public require assurances that the decision to apply herbicides will not result in negative health effects to their customers. Further, drinking water supplies often serve multiple uses as a local or regional amenity for recreation, wildlife, and the preservation of natural resources. Similar to public health, the decision to apply herbicides to a water supply should not severely impact non-water supply functions of the waterbody.

Because of the recognition that negative impacts of pesticides have the potential to outweigh their benefits, in the US all pesticides and herbicides are subject to extensive, rigorous testing to determine 1) efficacy for specific use scenarios and target species and 2) the potential adverse impacts to human and ecologic health. The registration process for pesticides takes years to complete and requires substantial data prior to any environmental release. Initial registration is typically conditional and is only granted after an experimental use period that requires site-specific record-keeping and extensive field trial data collection that can last two to three years (McGaughey 2012). Registration of a pesticide comes with strict controls on the application and use of the product as detailed by the pesticide label, which is a legally enforceable requirement for their use (EPA 2018). The label restrictions are custom to each pesticide based on the data from the registration process that addresses toxicology, environmental hazards, residue chemistry, fate and transport and other factors. Even after registration at the federal level, many states conduct independent reviews prior to allowing pesticides and herbicides to be applied. Further, pesticide registration review is required approximately every 15 years to incorporate new science and evaluate data collected from pesticide use.

The two primary herbicides considered in this project for the control of hydrilla were fluridone and endothall. These two herbicides are effective against hydrilla, have been registered for aquatic plant management since 1986 and 1960, respectively, and are available in all states (CDMS 2018). Therefore, both have been used extensively and have undergone multiple registration reviews and independent assessments. For this project, ten assessments and studies of the human health and ecological impacts associated with of their use were reviewed (listed below). The independent assessments of the risks repeatedly came to similar conclusions that these two herbicides will result in no significant adverse effects when properly following the label directions.

- Generic Environmental Impact Statement on Aquatic Vegetation Management (endothall), 1981, prepared for the New York State Department of Environmental Conservation
- Fluridone Human Health Risk Assessment, 1992, prepared by the Washington Department of Ecology

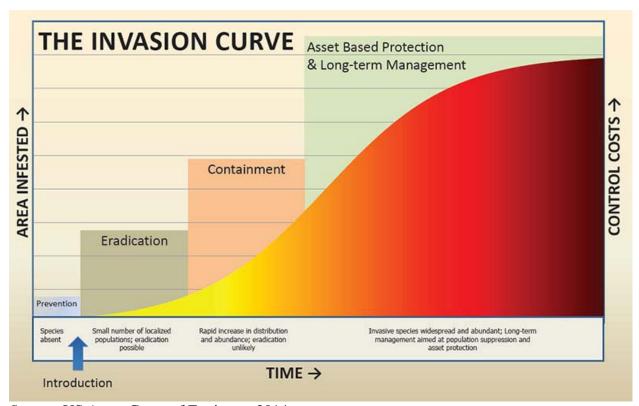
¹⁸ State-specific restrictions may apply to their use.

- Supplemental Generic Environmental Impact Statement on Aquatic Vegetation Management (fluridone), 1995, prepared for the New York State Department of Environmental Conservation
- Human Health Effects of Endothall, 2001, prepared by the Washington Department of Ecology
- Fluridone Ecological Risk Assessment, 2005, prepared for the Bureau of Land Management
- Fluridone: Human Health and Ecological Risk Assessment Final Report, 2008, prepared for the US Department of Agriculture Forest Service
- Endothall: Human Health and Ecological Risk Assessment Final Report, 2009, prepared for the US Department of Agriculture Forest Service
- *Egeria densa* Biological Assessment, 2012, prepared by the California Department of Boating and Waterways
- Public Health Evaluations for Potential Exposures to Fluridone or Endothall Used for Treatment of *Hydrilla verticillata* in the Eno River, Orange and Durham Counties, NC, 2015, North Carolina Division of Public Health
- Impact of Low Dose Fluridone Treatments on Aquatic Plant Richness and Non-Target Species, 2017, prepared by Ken Wagner

Other aquatic herbicides that are effective against hydrilla (bispyribac-sodium, flumioxazin, imazamox, penoxsulam, topramezone, etc.) undergo the same rigorous EPA registration process. While these herbicides are newer than endothall and fluridone and there are fewer independent assessments of risks, available information indicates the label restrictions are sufficient to prevent adverse impacts (Washington Department of Ecology 2012).

Broadly speaking, no information was identified during the course of this project that would suggest that herbicides should categorically be excluded from use in sources of drinking water. However, public perception may remain an obstacle for utilities' considering the use of herbicides to manage hydrilla. The case studies reviewed during this project revealed that a focused effort to describe the risks and benefits to the public in advance of the herbicide application was valuable for obtaining stakeholder acceptance.

The decision to use herbicides to control hydrilla in sources of drinking water is an individual utility decision. Utilities and water resource managers must weigh the costs and risks from no action, chemical control, and non-chemical control options for their sources of drinking water to develop the optimum approach for addressing this aggressive aquatic invasive plant.



Source: US Army Corps of Engineers 2014. Figure 7 Invasive species management curve

However, preventing invasive species from becoming established is both the most effective and least costly option for managing invasive species. As stated previously, engaging with recreational users and others that access drinking water sources to help prevent the spread of invasive species, or to facilitate early identification, will help reduce the occurrence of hydrilla and avoid more costly management actions. Figure 7 was developed by the US Department of Agriculture and the US Army Corps of Engineers based on decades of experience managing invasive species across the US. It illustrates that over time as invasive species become more established, the effort and costs associated with management escalate dramatically. If it is believed hydrilla could become introduced based on source protection planning, development of an invasive species management plan prior to their occurrence in sources of supply will help utilities respond quickly to aggressive invasive species such as hydrilla. A strong focus on prevention and on rapid response in the early stages following introduction will reduce long-term management costs and improve the potential for success.

APPENDIX A SELECT RESOURCES FOR DRINKING WATER UTILITIES

GENERAL RESOURCES

Hydrilla Identification

• Hydrilla Identification Fact Sheet prepared by the New Jersey Water Supply Authority. http://www.njwsa.org/uploads/1/0/8/0/108064771/hydrilla_fact_sheet_elodacomparis on.pdf.

General Aquatic Plant Management

Wagner, K. J. (2004). The practical guide to lake management in Massachusetts: a
companion to the final generic environmental impact report on eutrophication and
aquatic plant management in Massachusetts. Commonwealth of Massachusetts,
Executive Office of Environmental Affairs. Available at
http://www.mass.gov/eea/docs/dcr/watersupply/lakepond/downloads/practical-guideno-pics.pdf.

Herbicide Labels

- Crop Data Management Systems, Inc. Herbicide Label Database. http://www.cdms.net/Label-Database.
- EPA Pesticide Product and Label System. https://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1.

HYDRILLA MANAGEMENT CASE STUDY RESOURCES

Cayuga Inlet Managed by the Hydrilla Task Force of the Cayuga Lake Watershed

• Cornell Cooperative Extension of Tompkins County. http://ccetompkins.org/environment/invasive-nuisance-species/aquatic-invasives/hydrilla/fighting-hydrilla-in-the-cayuga-lake-watershed/cayuga-inlet-eradication-project-management-plan.

Croton River Managed by the New York State Department of Environmental Conservation

• Croton River Hydrilla Control Project. http://www.dec.ny.gov/animals/106386.html.

Delaware & Raritan Canal Managed by the New Jersey Water Supply Authority

• Hydrilla: An Invasive Water Weed. http://www.njwsa.org/hydrilla.html.

Tonawanda Creek/Erie Canal Managed by the US Army Corps of Engineers

- Great Lakes Hydrilla Collaborative. http://hydrillacollaborative.com/Home/CaseStudies.
- Cornell Cooperative Extension Western New York Hydrilla Project. http://erie.cce.cornell.edu/invasive-species/wny-hydrilla-project.

APPENDIX B

HYDRILLA MANAGEMENT FREQUENTLY ASKED QUESTIONS AND ANSWERS FOR COMMUNICATIONS AND OUTREACH

The following frequently asked questions and answers were developed for DEP to use in public outreach communications. Many of these can be used directly by utilities for answering questions from the public on hydrilla. Others that are specific to DEP and New Croton Reservoir can be used as examples for utilities to develop their own questions and answers for public outreach on chemical control of hydrilla.

GENERAL INFORMATION ON HYDRILLA

- 1) What is hydrilla?
 - a) Hydrilla is an aquatic invasive (non-native) plant that can grow quickly and prevent growth of native plant species. It can infest large portions of lakes and rivers, causing a variety of impacts to water quality, natural resources, and recreational use.
- 2) Why should I care?
 - a) Hydrilla grows in water up to 20 to 40 feet deep and forms dense mats that shade out other species.
 - b) The thick mats at the surface interfere with boating and swimming.
 - c) Hydrilla changes local ecology by killing off native plant species, changing the ecology.
 - d) Hydrilla causes changes to water quality, particularly in the fall when the mass of vegetation dies off and decays.
 - e) The dead vegetation can clog drinking water, irrigation and cooling intakes and
 - f) It can reduce sportfish populations due to loss of open water and native vegetation.
 - g) It can harm the local economy by impacting tourism and waterfront property values.
- 3) How does hydrilla spread?
 - a) Hydrilla reproduces in multiple ways from seeds, tubers, turions (buds), and plant fragments.
 - b) Hydrilla fragments can remain viable out of water in moist conditions for up to four days.
 - c) Tubers and turions in sediment can remain dormant for several years and can withstand ice cover and drying.
- 4) What is hydrilla's habitat?
 - a) Hydrilla can grow in a wide variety of still and slow-moving waters, such as freshwater lakes, ponds, rivers, reservoirs and canals.
 - b) It tolerates a wide range of pH, nutrient, salinity and light levels.
 - c) The optimum temperature for growth is 68-81°F (20-27°C). In colder areas, it dies back and relies on buried tubers for next year's growth. In warmer areas, it does not fully die back during the winter.
- 5) How can we stop hydrilla?

- a) Typical ways of controlling aquatic plant growth include physical removal, biological controls, and herbicides.
- b) Because hydrilla can easily regrow and spread from plant fragments, physical removal is not used due to the risk of making the infestation worse.
- c) Effective biological controls are currently limited to adding sterile grass carp, which are restricted in New York, and many other states, to waters with no possibility of escape for the fish.
- d) Herbicides are the predominant method for controlling hydrilla in New York and have been used in the Erie Canal, the Croton River, Cayuga Lake, and Cayuga Inlet.
 - i) The two primary herbicides used to control hydrilla in New York are fluridone and endothall.
 - ii) These two herbicides have been registered for aquatic plant management since 1986 and 1960, respectively, and are approved in all states.
 - iii) Both herbicides are approved in sources of drinking water when following the label restrictions.
 - iv) Other herbicides that can help control hydrilla include bispyribac-sodium, flumioxazin, imazamox, penoxsulam, and topramezone, but may not be approved in all states.
- e) Controlling hydrilla requires continued treatment for years to truly eliminate the infestation.
- 6) What can I do to prevent the spread of hydrilla?
 - a) Inspect and remove plant fragments and mud from boats, trailers, and equipment before and after each use.
 - b) Dispose of all debris in trash cans or above the waterline on dry land, because tubers and turions can be transported in clumps of sediment.
 - c) Clean and dry your equipment thoroughly before visiting other bodies of water and remove any plant fragments from boats, trailers and equipment.
 - d) Do not dispose of unwanted aquarium plants in water, ditches or canals.
 - e) Monitor recently acquired aquatic plants, because hydrilla tubers can be transported in the attached soil/growing material.

SPECIFIC INFORMATION FOR FLURIDONE TREATMENT IN NEW CROTON RESERVOIR

- 1) When did DEP discover hydrilla in New Croton Reservoir?
 - a) Hydrilla was identified in the Reservoir in October 2014.
 - b) The largest infestation is in proximity to a boat launch that is not open to the public.
 - c) DEP installed small barriers around the boat launch in 2015 and 2016 to limit hydrilla's spread, while further study was ongoing.
 - d) Surveys of the reservoir in 2016 and 2017 identified additional locations of hydrilla that range from sparse to dense.
- 2) How could hydrilla impact DEP?
 - a) If left untreated, hydrilla is expected to infest all viable parts of the reservoir (19% to 55% of the surface area) including DEP's upstream reservoirs as well the Croton River and Hudson River downstream. Hydrilla in the Croton System risks its spread into Kensico Reservoir.

- b) The large biomass will change water quality and increase plant debris and decay (called natural organic matter) that can react with disinfectants to form undesired chemicals that are regulated in drinking water.
- c) Hydrilla biomass can also cause clogging of intakes and treatment processes.
- 3) What herbicide is DEP considering for New Croton Reservoir?
 - a) DEP is planning to use fluridone slow-release pellets at locations of hydrilla infestation.
 - b) DEP will apply the herbicide at low doses (approximately 2 to 4 parts per billion[ppb]) for 90 to 120 days during the spring and summer months.
 - c) DEP expects they'll need to treat for up to five years to effectively control hydrilla. Treatment could occur after the first five years, but at lower levels to ensure complete removal.
- 4) What are the risks to drinking water safety from fluridone?
 - a) USEPA approves the use of fluoridone for application near drinking water intakes at concentrations up to 20 ppb, well above DEP's planned dose of 2 to 4 ppb.
 - b) The New York State Department of Environmental Conservation also approves use of fluridone in New York.
 - c) Based on toxicology studies and a treatment dose of 4 ppb, an adult would have to drink more than 200,000 liters of water before it would cause negative effects, and a child would have to drink over 35,000 liters of water.
 - d) DEP's drinking water intake at New Croton Reservoir is deep and not expected to pull in the herbicide.
 - e) Significant thermal layering (a thermocline) typically develops in the reservoir in the spring and summer and prevents water in the upper 20 to 30 feet of the reservoir from mixing with deeper water. The water intakes are below 30 feet. Fluridone will only be applied in the shallower portions of the reservoir where hydrilla is growing, so it is not expected to reach the intakes.
- 5) What are the effects on fish in the reservoir from fluridone?
 - a) While studies show that fish do absorb fluridone, it dissipates over time and does not bioaccumulate.
 - b) Potential impacts to fish from fluridone are not a concern until concentrations reach 500 ppb to over 8,000 ppb (depending on species), which is well above doses for hydrilla control.
- 6) What are the potential impacts to the Reservoir's ecology?
 - a) Impacts to plants other than hydrilla are expected to be low, because hydrilla is more sensitive to fluridone treatment than other plant species.
 - b) It is expected that herbicide treatment will result in fewer ecological impacts than potential impacts from a large-scale hydrilla infestation.
- 7) How will fluridone application at New Croton Reservoir affect fluridone application in the Croton River downstream?
 - a) DEP will coordinate with New York State Department of Environmental Conservation to ensure fluridone levels remain in the target range for the Croton River.
- 8) Where can I find more information on fluridone?
 - a) http://ccetompkins.org/environment/aquatic-invasives/hydrilla/management-options/herbicides/fluridone/fluridone-faq

- 9) Where can I find more information on hydrilla in New Croton Reservoir?
 - a) DEP will have a website with information on the herbicide treatment program for New Croton Reservoir.

RECREATIONAL OUTREACH

- 1) Where are the closest hydrilla infestations to New Croton Reservoir and the Croton River?
 - a) Hydrilla is in a small pond in Orange County, NY and the Silvermine River in Norwalk and New Canaan, Connecticut, both which are approximately 20 miles from New Croton Reservoir. Other nearby locations of hydrilla are the Connecticut River in Connecticut and the Delaware and Raritan Canal in New Jersey, both which are approximately 65 miles away.
 - b) Hydrilla is not currently widespread in the northeast, so managing hydrilla in New Croton Reservoir is regionally important to prevent further spread.
- 2) How long does DEP think fluridone treatment will be needed in New Croton Reservoir?
 - a) Intensive treatment is expected to be required for up to five years to provide effective hydrilla control. Decreasing amounts of treatment would be required for an additional five years as the infestation is reduced.
 - b) Control of hydrilla requires sustained management over a period of years to deplete the energy reserves within the tuber bank and ultimately eradicate the infestation.
- 3) What is DEP doing to prevent the spread of hydrilla?
 - a) DEP requires that boats be steam cleaned and stored onsite at the reservoir to prevent further spread of hydrilla.
 - b) DEP will work with contractors and agencies accessing the reservoir to ensure boats on official business do not spread or reintroduce hydrilla to the reservoir.
- 4) How will recreational users be notified during herbicide application?
 - a) DEP will use signs to ensure recreational users of the reservoir are aware of herbicide application.
 - b) DEP will use local newspapers to notify the public about the herbicide application.

APPENDIX C WORKSHOP MATERIALS







November 9, 2017

CHEMICAL MANAGEMENT OF HYDRILLA FOR DRINKING WATER UTILITIES

Workshop Background Materials

The primary objective of this project is to provide review of hydrilla control using fluridone in sources of drinking water. The review will be focused on the New York City Department of Environmental Protection's (DEP) upcoming plan for treatment of the New Croton Reservoir, but will also include input from case studies that have previously used fluridone for hydrilla control. This document provides background information on the New Croton Reservoir hydrilla infestation to support workshop discussions.

New Croton Reservoir: New Croton Reservoir, formed by impounding the Croton River, is the terminal reservoir of the Croton System and receives water from eleven other Croton System reservoirs. The Croton System typically supplies approximately 10 percent of NYC's drinking water demands. However, during drought conditions, the Croton System yield is sufficient to meet up to 30 percent of the City's demand. All water diverted from New Croton Reservoir by DEP flows to the Croton Water Filtration Plant (WFP) via the New Croton Aqueduct. Spills and releases from the reservoir continue down the Croton River to the Hudson River. In addition to supplying water for the City, there are a number of intakes for other utilities at New Croton Reservoir.

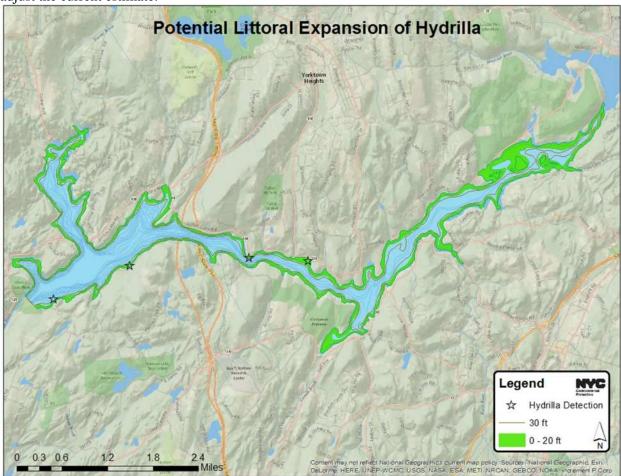
- Location and size: Located in Westchester County, approximately 22 miles north of New York City. Surface area is approximately 57 square miles and the reservoir has a capacity of 19 billion gallons.
- Access: DEP owns the property surrounding the reservoir and controls access to the adjacent watershed. A permit is required, which allows individuals to fish from shore or fish from nonmotorized boats. Swimming is not allowed in the reservoir.
- Fisheries: The reservoir supports numerous fish species and is popular for recreational fishing. The reservoir supports a warm and cool water fishery with large and small mouth bass, chain pickerel, yellow and white perch, black crappie, bullfish and sunfish predominating. The reservoir itself is not stocked, but its upstream tributaries are stocked with trout.
- Water quality: The water quality classification for the reservoir is Class AA throughout its entire length, which indicates the highest and best use of the reservoir is for drinking water.
- Drinking Water Intake: The elevation of the reservoir at full pool is 196 feet. The reservoir is generally kept within two feet of full pool, except during drought conditions. The drinking water intakes are located at the upper release (166 ft. elevation) and lower release (116 ft. elevation).





- Drinking Water Treatment: Treatment involves stacked dissolved air floatation and filtration with anthracite/sand dual media filter. The filtered water is then disinfected by treatment with UV and chlorine. After treatment, the water is chemically adjusted as required and subsequently dosed with orthophosphate for corrosion control and hydrofluorosilicic acid to add fluoride.
 - o UV System Type: Low pressure high output narrow spectrum
 - o UV Transmittance: > 95%
 - o UV Reduction Equivalent Dose (RED): 40 mJ/cm2
 - o Wavelength: 253.7 nanometers

Hydrilla Detection: Results from aquatic vegetation surveys of New Croton Reservoir from 2014/2015 identified a number of locations of hydrilla. The total area of hydrilla infestation in the reservoir is estimated at approximately 50 acres. However, additional surveys were conducted in 2017, which may adjust the current estimate.







DEP's Objective: The objective of DEP's plan for fluridone treatment of New Croton Reservoir is to achieve complete eradication of the infestation.

Constraints on Hydrilla Management in New Croton Reservoir:

- Hydrilla infestations located within ¼ mile of intake limits herbicide options
- New York State Department of Environmental Conservation (NYSDEC) indicated they would not permit the introduction of sterile grass carp to the reservoir

Other Considerations: The NYSDEC is treating the Croton River downstream of New Croton Reservoir with fluridone for hydrilla control. The first treatment occurred between July and October 2017. Per the Croton River 5-year Management Plan, the treatment target for the Croton River is 2 ppb of fluridone. Coordination considerations include:

- Migration of fluridone from the reservoir treatment areas to the river could affect the concentrations for the river treatment.
- Water releases from the reservoir need to be high enough to submerge hydrilla on the river banks and allow for herbicide contact.

Additional Resources:

- NYSDEC website has details of both the Croton River and New Croton Reservoir hydrilla infestations http://www.dec.ny.gov/animals/106386.html
- DEP Watershed Water Quality Annual Reports: These reports provide an annual overview of
 watershed water quality throughout the NYC water supply system, and therefore provide a
 summary of relevant ambient water quality conditions.
 - o http://www.nyc.gov/html/dep/pdf/reports/fad_5.1_watershed_monitoring_program___2015_watershed_water_quality_annual_report_07-16.pdf
 - o http://www.nyc.gov/html/dep/pdf/reports/fad_5.1_watershed_monitoring_program___2016_watershed_water_quality_annual_report_07-17.pdf







CHEMICAL MANAGEMENT OF HYDRILLA FOR DRINKING WATER UTILITIES

Workshop Agenda November 17, 2016 NYCDEP Offices 2nd Floor Conference Room 465 Columbus Avenue Valhalla, NY 10595

TIME	TOPIC	DETAILS
8:00 AM	Coffee / Refreshments	
8:30 AM	Opening	WRF introduce goals/purpose of the workshop
		· DEP Welcome
		Facilitators review agenda, ground rules, logistics
		· Participants introduce themselves, identify their name and organization.
9:00 AM	Topic #1: Selection of hydrilla control strategies	· Meredith Taylor, DEP, overview of New Croton Reservoir hydrilla and DEP's rationale for selecting fluridone treatment
		Review of selection criteria from case studies
		Input from outside experts
		· Questions and Discussion
10:30 AM	Break	
	Topic #2: Fluridone: Environmental fate and safe practices	· Rob Richardson, NC State University, overview of fluridone fate and transport
10:45 AM		Review safe practices implemented by case studies
		· Input from outside experts
		· Questions and Discussion
12:15 PM	Lunch	
1:00 PM	Topic #3: Contingency planning for herbicide use in sources of drinking water	Ben Wright, Hazen and Sawyer, assessing risks from fluridone treatment
		Brainstorming of potential risks and contingencies
		Review of contingencies from case studies
		Input from outside experts
		· Questions and Discussion
2:30 PM	Wrap-up discussion	Summarize main discussion points
		· Review recommendations
		· Closing remarks and adjourn







Workshop Discussion Questions

- 1. Topic #1: Selection of hydrilla control strategies
 - a. Pros and cons of eradication vs long-term management vs "No Action" options
 - b. Factors that would preclude the use of herbicide treatment
 - c. Other herbicide options for drinking water sources
 - d. Strategies for preventing future infestation
 - e. Likelihood of herbicide resistance and methods to prevent it
 - f. Effectiveness and impacts of non-chemical alternatives (e.g. lower reservoir and and dredge tuber bank)
- 2. Topic #2: Chemical treatment: Environmental fate and safe practices
 - a. Need and/or effectiveness of booms to contain the treated area
 - b. Potential for toxic degradation byproducts n-methyl formamide and 3-trifluoromethyl benzoic acid
 - c. Communicating public health protections (pesticide registration toxicology results, multiple barrier approach, etc.)
 - d. Monitoring options to ensure water supply is safe (continuous, frequency of grab samples, locations, etc.)
 - e. Specific Operational Considerations for DEP
 - f. Coordination with Croton River treatment
 - g. Maintaining reservoir levels during treatment (is it important?)
 - h. Public outreach examples/practices (sharing data, project updates, etc.)
- 3. Topic #3: Contingency planning for herbicide use in sources of drinking water
 - a. Technologies for alerting utilities of problems
 - b. Mitigation actions in the event of a spill or other issue
 - c. Communication strategies for contingencies (both internal and to the public)







Chemical Management Of Hydrilla For Drinking Water Utilities

Date: November 16, 2017, 12:30pm – 4:00pm Location: New Croton Reservoir Site Visit Project ID: Water Research Foundation 4747

Name	Bureau, Office
Alice Fulner	WRF
Alice Fulner Rob Rechardson	Nesu
Nak Heilman	SePRO
MeredithTaylor	NYC DEP
MINE USA	Dap
Sennifer Warner	WRF
unda Duebalt	Hozen
TINA NELSON	HAZEN
Ben Weich	Huzen
Chris Duile	Solit-de Lite M
	Y.,
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Chemical Management Of Hydrilla For Drinking Water Utilities

Date: November 17, 2017, 8:30am - 3:00pm

Location: Valhalla Training Room

Project ID: Water Research Foundation 4747

Name	Bureau, Office
Ben Write	HLZE ~
Orren Schneider	American water
Josh Weiss	Hazen
Vennifer Warney	Worter RF
Dale Boy best	150/Bu3
Heatner Desko	NT Water Suppy Auth
Chris Doyle	Solitide Lile Min
David Mitchell	Sturbnidge MA
Rob Richardson	NCSU
Mark Heilman	Se PRO
hunds Dubolt	Hazen
Cothy McGlynn	NYSDEC
Mike Green	USACE Buffalo
MATT VALAPE	HAZEN
Poul Leuz	BWS
Alice Fulmer	WRF
WILLOW EYRES	LYSDEC
trather landis	Hazen
Anthony Lamanno	NYSDEC

APPENDIX D WORKSHOP PRESENTATIONS



Hydrilla in New Croton Reservoir

Meredith Taylor, NYC DEP

Overview



- Hydrilla in the Croton System
- New Croton Management Objectives and Constraints
- New Croton Reservoir Physical Conditions

Hydrilla in the Croton System





 Fall 2013- David Werier discovers hydrilla in mouth of Croton River during RTE survey, confirmed by DEC



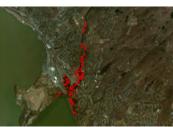
 Summer 2014- Allied Biological survey documents extensive but sporadic hydrilla, base of New Croton Reservoir to Croton Bay

 Summer 2014- Hydrilla discovered New Croton Reservoir in several patches at dam and near boat launch; not found upstream

3

Hydrilla in the Croton System





• Fall 2014- NYSDEC/DEP meet and begin to put together a response plan



 Summer 2015- Allied Biological hydrilla survey of Hudson River and Croton Bay & 46 locations in the Hudson River, DEP surveys reservoir and finds 4 distinct infestations

 Fall 2015- DEP installs Aquascreen benthic barriers at boat launch and continues to strategize on a treatment/eradication program

Hydrilla in the Croton System

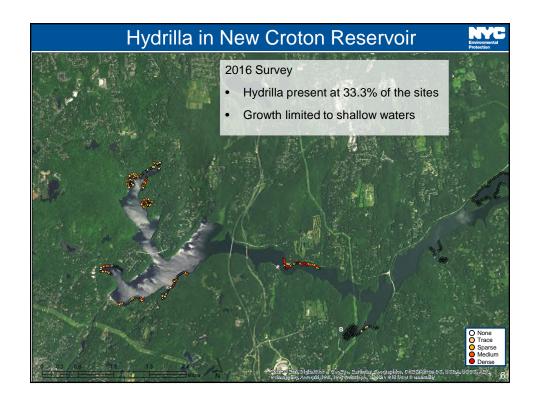




- Summer 2016- DEP continues to use benthic barriers at the boat launch
 - NYSDEC plans to treat the Croton River with endothall but the treatment is postponed due to high flows out of New Croton Reservoir (resulting from high rainfall and an HAB)



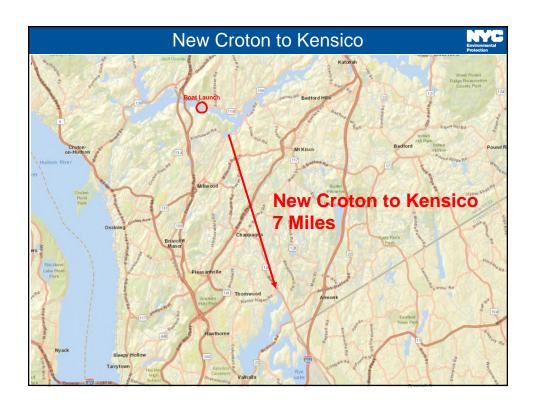
- Winter 2017- DEP presents control plan to DEP Commissioner. Deputy Mayor directs DEP to engage objective experts to review strategy and options.
- **Summer 2017-** NYSDEC treats the Croton River with fluridone

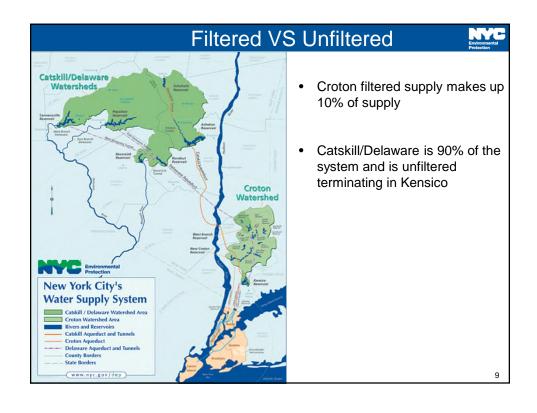


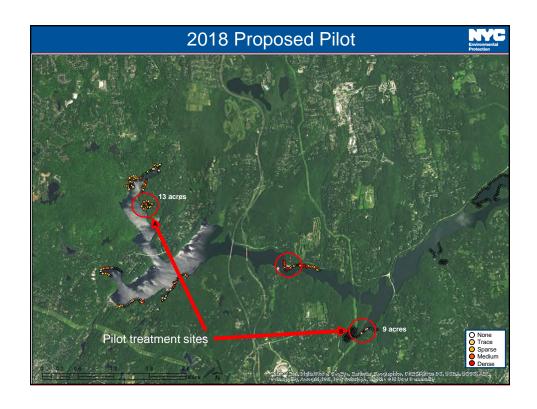
Hydrilla Management Objectives



- The New York City Department of Environmental Protection (DEP) protects public health and the environment by supplying clean drinking water, collecting and treating wastewater, and reducing air, noise, and hazardous materials pollution.
- DEP is primarily concerned with the drinking water supply vs NYSDEC's broader ecological concerns
- New Croton Reservoir is treated with sodium hypochlorite, phosphoric acid, alum and by UV and filtered through sand and anthracite as part of the Croton System
- #1 Concern is to prevent spread to the unfiltered Catskill/Delaware system
- Eradication would most likely need to be the goal in order to justify the use of chemical treatment







Pilot Project Description



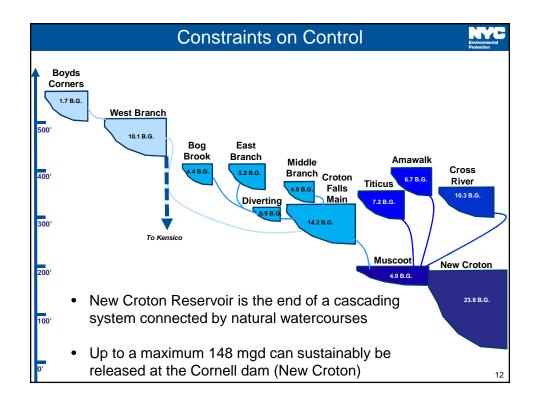
. Chemical Treatment at site A and B

- Sonar H4C (2.7% fluridone) A pellet applied at low concentrations 5 times, July 1 – September 30.
- Applied at 2 ppb (NY MCL drinking water = 50 ppb)
- Can be applied around active intakes not during pilot
- · Used in drinking water supply in California for many years
- · Boom & curtain for pilot will prevent any spread
- Weekly WQ samples to be collected throughout the reservoir to monitor for spread outside treatment area

Diver Assisted Suction Harvesting at site C



- Physically remove plants around the boat launch
- · Short-term solution to prevent spread



Other Constraints



- New Croton supply will need to be at full capacity (Minimal/No Releases):
 - October of 2018, 2019, 2020 while the Catskill Aqueduct is being cleaned
 - October May of 2022, and 2023 for the Rondout bypass tunnel construction
- NYSDEC won't permit the use of grass carp due to risk of downstream spread and there are concerns with native SAV in reservoir
- The New Croton boat launch will be moving to the east in 2018
- Required Min. Flow according to Title 6 DEC Part 672-3:
 - April 1 June 30
 75 mgd unless below normal then 16.5 mgd
 - July 1 March 31 5.5 mgd

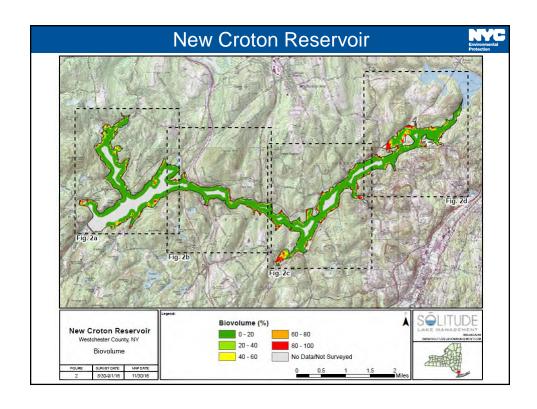
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Other Considerations



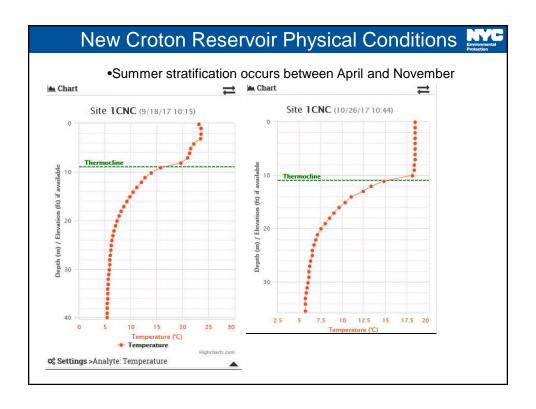
- Stakeholder perception of treatment with herbicides regulators, consumers, environmental groups
- · Permitting/ Very few control options
- Persistence of tubers- need to stay at "eradication" for > 5-10 years
- Limited surveillance information
- Multiple transport vectors and few impediments to transport
- Probability of having necessary conditions to treat consistently

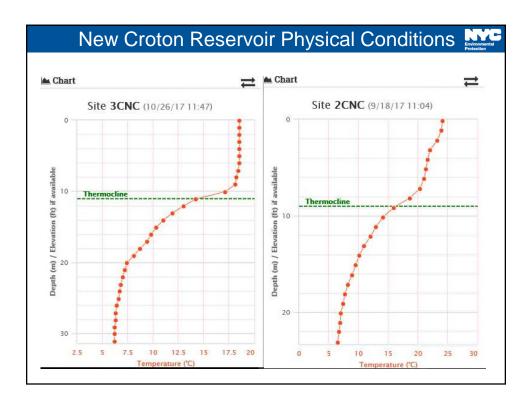




Other SAV Present Common Name Scientific Name # % Occurrences Occurrence Overall SAV 99.1% 339 Coontail Ceratophyllum demersum 310 90.6% Eurasian Water Milfoil Myriophyllum spicatum 306 89.5% Hydrilla Hydrilla verticillata 114 33.3% Benthic Filamentous Algae 111 32.5% Water Smartweed Polygonum amphibium 44 12.9% Small Duckweed Lemna minor 20 5.8% Great Duckweed Polyrhiza spirodela 14 4.1% Common Watermeal 13 3.8% Wolffia columbiana **Brittle Naiad** Najas minor 10 2.9% White Water Lily Nymphaea odorata 3 0.9% Leafy Pondweed Potamogeton foliosus 3 0.9% Long-leaf Pondweed Potamogeton nodosus 3 0.9% Clasping-leaf Pondweed Potamogeton richardsonii 1 0.3% Bassweed Potamogeton amplifolius 1 0.3% Spikerush 0.3% Eleocharis sp.

Submersed Aquatic Vegetation Abundance Summary 2016 - Solitude Lake Management



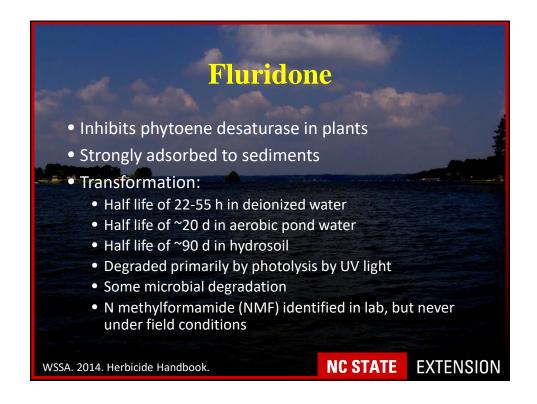


New Croton Reservoir Physical Conditions



- · pH is typically circumneutral
 - 2016: 11% of samples exceeded 8.5 which may reflect algal blooms in surface samples during July, August, and September
- Mean alkalinity for 2016 was 68 mg Calcium Carbonate/L
- Phosphorus is on average ~19 ppm
- Nitrogen 3% of samples in 2016 exceeded 0.5 ppm
- Dissolved oxygen varies by depth and conditions but can be found in the range of 0.2 mg/L - 12.5 mg/L



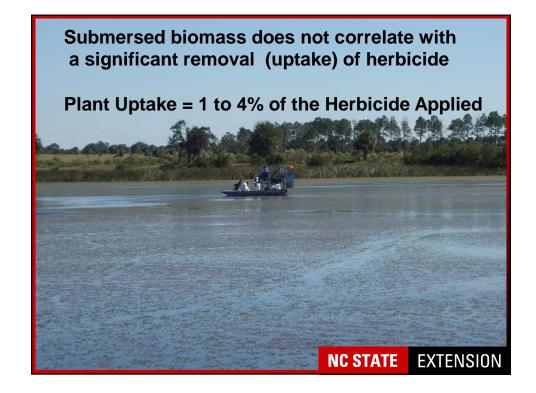


Fluridone Degradation Fluridone degradation occurs in the water column via photolysis by UV light

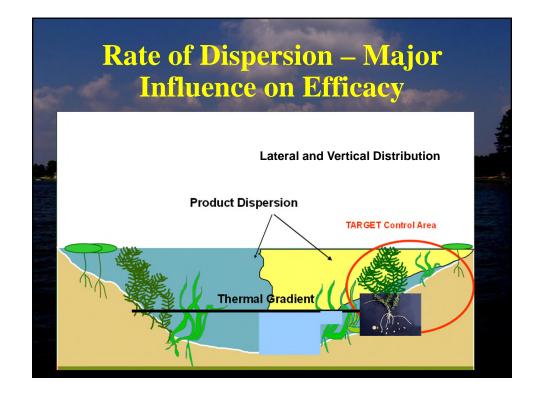
- UV light can only penetrate most natural waters to a depth of a few inches
 - Water depth will have a significant influence on the speed of degradation (while the rate of degradation remains the same in the top few inches, increased water depth = more fluridone to degrade)
 - Microbial degradation occurs, but is much slower than photolysis

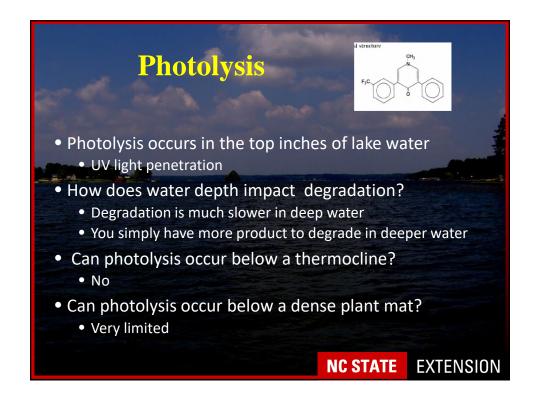
NC STATE

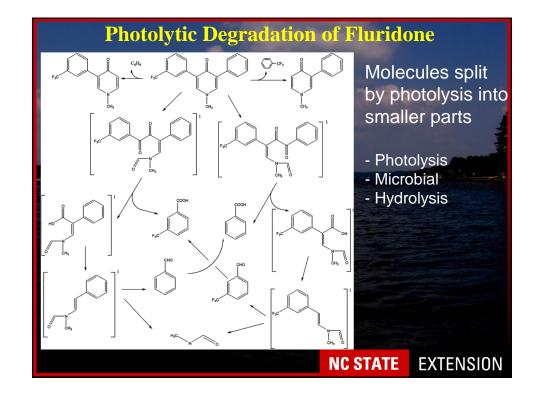
EXTENSION



Herbicide Dispersion • Aquatic herbicides disperse in water • Movement from the application site • Flow, winds, current – drive dispersion • Scale of treatment is a major factor • Concentrations can be rapidly diluted • Can be advantageous or disadvantageous • Dispersion and degradation are distinct processes • Together or individually, both processes can lead to non-detectable herbicide concentrations NC STATE EXTENSION







Use of Herbicides for Hydrilla

- Treat Water to Achieve a Desired Aqueous Concentration
 - You are Targeting the Plants!
- Each Herbicide Unique Concentration/ Exposure Profile
 - Concentrations can range from 10 to 4000 ppb
 - 400x difference in target rates
 - Exposure requirements from hrs to 3+ months
 - Up to 400X difference in exposure requirements
 - Longer exposures allow use of lower concentrations

NC STATE

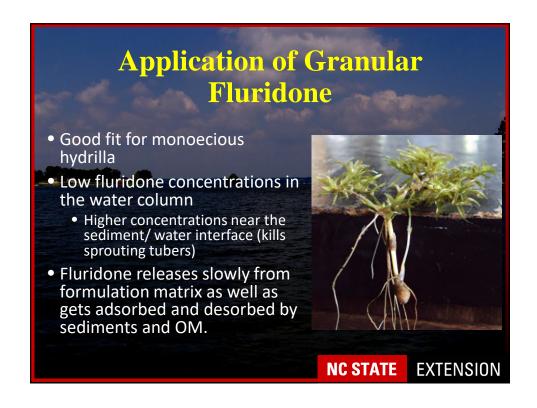
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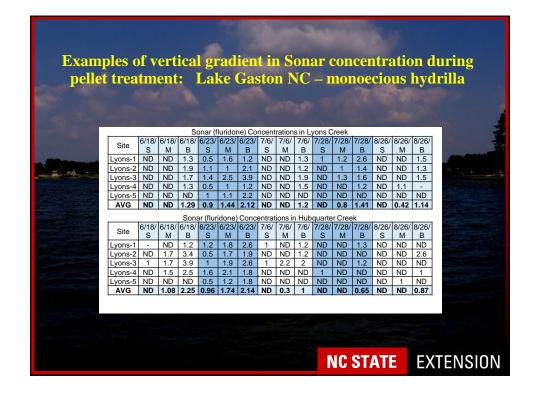
Monoecious Hydrilla Use Pattern

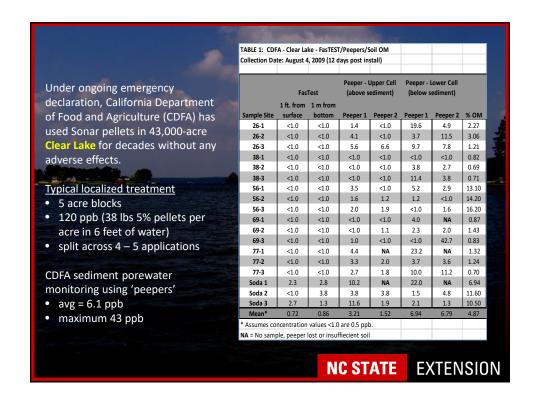
- Granular fluridone applied soon after tuber/turion sprouting (small hydrilla plants)
- Herbicide release from pellets provides low rate of fluridone over an extended period of time near sediment / water interface
- Proper application kills hydrilla shoots slowly; prevents establishment and new turion formation
- Repeated application over several years depletes the turion bank and provides long term control

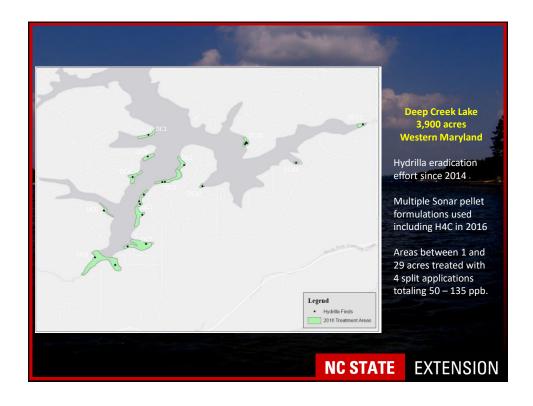
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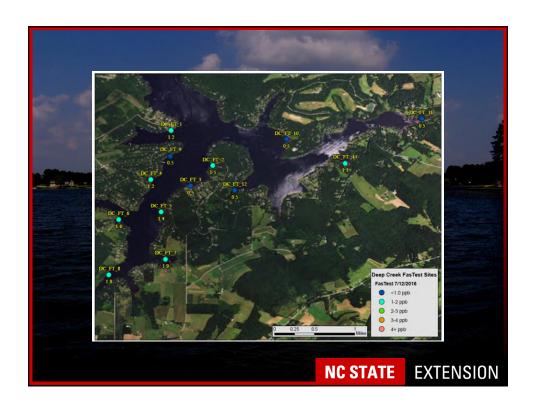
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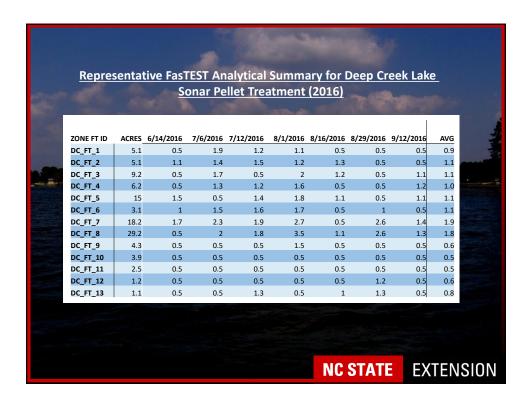


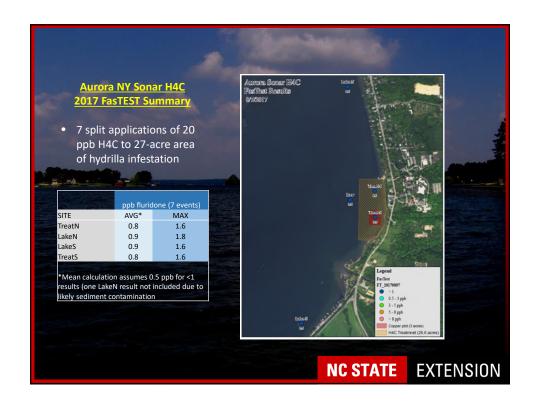




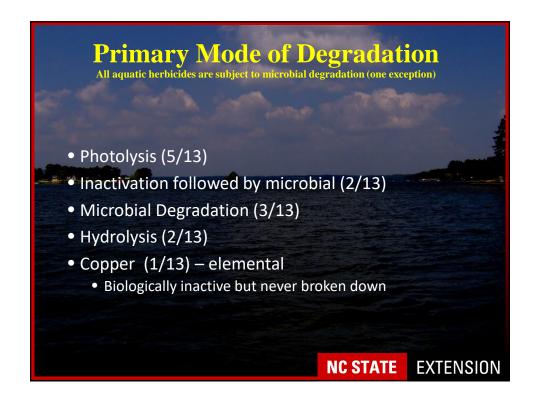


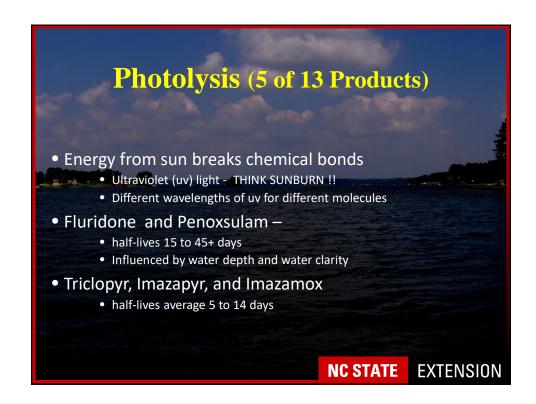














Understanding Fluridone Risks for Drinking Water





CHEMICAL MANAGEMENT OF HYDRILLA FOR DRINKING WATER UTILITIES November 17, 2017

Risk Considerations

Human Exposure (drinking water, fish consumption)

- What is the potential for exposure?
- What is the potential for exposure to result in negative health impacts?

Exposure to Non-target Organisms

• What is the potential for exposure to result in impacts as opposed to impacts from other alternatives?

Methodology

Approach to looking at herbicide exposure in this presentation is based on the typical multiple barrier approach used for assessing risk to drinking water

- 1. Minimize presence in the reservoir (i.e. keep herbicide doses as low as possible)
- 2. Natural attenuation

Dilution of partial lake treatment within the larger reservoir Natural degradation during residence time in the reservoir

- 3. Reduction through engineered water treatment
- 4. Risk of resulting level of exposure by consumers (acute and chronic)

Hazen

Fluridone Application

Label restricts fluridone in proximity to drinking water intakes to 20 ppb

4 ppb and below has been used at a number of other waterbodies Croton River, D&R Canal, California Bay Delta

Spot treatment vs whole lake treatment will provide some dilution depending on flow dynamics and location of treatment and intake locations

Natural Attenuation

Photolysis is a major mechanism for degradation of fluridone

Wavelengths \sim 297 nm are particularly effective (approx 15 to 60 hours per Mossler, Shilling, and Haller, 1989)

Microbial degradation is the second major mechanism for degradation of fluridone

Wide variation between lakes, lab studies have shown up to 35% removal over 100 to 150 days $\,$

Hazen

Fluridone Treatment Efficacy

Potential for fluridone removal with typical drinking water treatment processes

Sedimentation, Flocculation, Filtration

Some adsorption to soil particles is expected (NCBI, 2017)

 K_{oc} is per 260 to 740 cm³/gm, low to moderate soil adsorption (USEPA 2004)

Aeration

Volatilization from water surfaces is not expected to be an important fate process based upon fluridone estimated Henry's Law constant (NCBI, 2017)

UV Treatment

Designed for pathogen inactivation, wavelengths not optimized for fluridone Residence time is generally too short based on fluridone photolysis studies

Fluridone Treatment Efficacy, cont'd

Potential for fluridone removal with typical drinking water treatment processes

Biologically Active Filtration (ozone with carbon filters)

No information on the ability of ozone to oxidize fluridone

Adsorption is expected to occur to the carbon filter, though not optimized for synthetic organics removal

Residence time most likely too short to achieve substantial removal

Activated Carbon

Activated carbon has been found to remove fluridone

Jar tests are needed to confirm dose, contact time and effectiveness of specific carbon products

Hazen

USEPA Human Health Risk Assessment for Fluridone (2004)

Hazard Characterization of Fluridone

- The acute toxicity of fluridone is moderate to low.
- Fluridone was negative for inducing mutations in all guideline studies of the standard battery of mutagenicity tests.
- No neurotoxicity was reported in any of the studies.
- Fluridone did not significantly affect any of the reproductive parameters.
- In the available toxicity studies there were no estrogen, androgen and/or thyroid mediated toxicity, but may be subjected to additional screening and/or testing to better characterize effects related to endocrine disruption.

USEPA Human Health Risk Assessment for Fluridone (2004)

Tab	le 10 - Drinking W	ater Exposure	Fluridone M	OEs	
Exposed Person - Body Weight	Water Concentration (ug/l)	Water Consumption (liter/day)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	MOE
Acute Exposure					
Adult - 60 kg	20	2	0.00067	125	187500
Short/Intermediate Term	and Chronic Exposur	'es			
Adult - 60 kg	20	2	0.00067	15	22500
Adult - 70 kg	20	2	0.00057	15	26250
Infant/Child - 10 kg	20	1	0.00200	15	7500

Margin of Exposure (MOE) of a substance is the ratio of its noobserved-adverse-effect level (NOAEL) to its estimated dose of human intake

Hazen

USEPA Human Health Risk Assessment for Fluridone (2004)

T	able 11 - Drinking	Water Exposu	ire NMF MOI	Es	
Exposed Person - Body Weight	Water Concentration (ug/l)	Water Consumption (liter/day)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	МОЕ
Acute Exposure					
Adult - 60 kg	2.64	2	0.000088	10	113636
Short/Intermediate Term	Exposure				
Adult - 70 kg	2.64	2	0.000075	10	132576
Infant/Child - 10 kg	2.64	1	0.000264	10	37879

USEPA Fluridone Registration Review

Risk Assessment expected to be published in the next month or two

Record of decision expect in the May to July timeframe

"The Agency does not expect to conduct a drinking water assessment (DWA) as part of registration review for fluridone because maximum application rates to waters near drinking water inputs have not increased since the 2004 TRED."

Re-registration decision unlikely to affect current label restrictions on uses in sources of drinking water

Hazen

Ecotoxicology of Fluridone

California Boating and Waterways

Application and toxicity studies on ESA aquatic resources in Bay Delta region have shown no adverse effects in \sim 15 years of studies and treatments

Bureau of Land Management Fluridone Ecological Risk Assessment

The LC $_{50}$ (1.3 mg/L) was selected as the invertebrate acute TRV, and the NOAEL of 0.6 mg/L was selected as the chronic TRV.

The lower of the cold- and warmwater fish endpoints were selected as the TRVs for fish. Therefore the coldwater 96-hour LC $_{50}$ of 4.2 mg/L was selected as the acute TRV, and the warmwater fish NOAEL of 0.48 mg /L was used as the TRV for chronic effects.

Wagner et al, 2017 Impacts to species richness and non-target plants

Some observable impacts during first year, but recovery in year 2 and 3

APPENDIX E WORKSHOP DISCUSSION SUMMARY







November 17, 2017

CHEMICAL MANAGEMENT OF HYDRILLA FOR DRINKING WATER UTILITIES

Workshop Summary

Mechanical Treatment

1. Benthic Barriers

Consensus seems to be that using benthic mats/barriers are effective in the short term and as spot treatment. They cannot be left in place from season to season due to sediment settlement on top and likely vegetation growth making it extremely difficult to remove at a later date.

In the southern portion of Cayuga Lake, the mats were to support the SONAR treatment in the first year. The fluridone treatment was ineffective due to the water turnover in Fall Creek. In the Delaware and Raritan Canal (D&R Canal), the barriers are on the wish list of treatment methods as this is considered an ongoing management plan for the hydrilla removal. Henrietta Pond, in upstate New York, uses benthic barriers and it is effective, however this works due to the smaller size of the water body.

Limitations: Benthic barriers are not considered economically feasible as a standalone treatment method due to the size of the reservoir. Using the mats as more of a spot treatment would also prove to be too expensive. The NYC DEP estimated that for a small portion of treatment area the cost would be approximately two million dollars.

2. Hand-pulling/Hand-tool removal

Cayuga Lake/Inlet uses this method for new emergence of plants, if it is not dense growth, discovery in new areas, and for any remaining plants after fluridone treatment. This requires an intensive amount of monitoring. D&R Canal considers hand-pulling as part of the future management of hydrilla removal, in combination with spot treatments and potential use of benthic mats.

Limitations: Hand removal of the plant is problematic. Fragmentation of monecious hydrilla, the type found in New York, increases dispersion of viable plants capable of reproduction. Combining suction harvesting with hand-pulling can limit the amount of plant fragments.

3. Silt Curtains

Silt curtains are suspended vertically from the surface of the water to the sediment. The curtains can prolong contact time of the herbicide, capture fragments of the plant, or they can be used in areas with increased water flow to deflect the current and reduce the dilution of the herbicide in the treatment area.

Limitations: Economically and logistically not feasible due to the size and depth of the Reservoir. Could potentially use curtains for pilot areas, however this will depend on desired outcome of testing. It will







prove difficult to curtain the pilot area (20 miles). The curtain would need to be up for 60-90 days. Could be damaged in that time. Fishermen could damage with boat.

Biocontrol

1. Carp

Grass carp stocking is used in other states which permit the introduction of the fish. Grass carp are commonly used in aquatic weed control due to their plant-based diet. Most states require the use of sterile triploid carp if introduced into the water ways.

Limitations: Though grass carp have been used in other states to assist with the removal of hydrilla infestations, the New York State Department of Environmental Conservation (NYSDEC) will not permit the introduction into the Reservoir.

2. Arthropods

Scientists are currently conducting research on the use of arthropods as biological control. Larvae of insects typically associated with hydrilla and other macrophytes feed on the plant tissue. There is a researcher in China and Korea currently working with chironimdae which are very effective on hydrilla. There is possible quarantine testing soon.

Limitations: Research is ongoing, still in testing phase.

Herbicides / Chemical Treatment

The size of the infestation usually dictates the use of herbicides as the primary treatment method. If herbicides are chosen as the treatment method, a management plan including other types of treatment will likely be more successful.

Multiple year management plans are necessary for eradication. None of the herbicides will translocate to the tuber bank. By removing the shoots each season, the tuber bank will slowly be depleted. Most eradication programs using fluridone have a policy of treating 1-3 seasons beyond the absence of hydrilla to assure success.

1. Chelated copper:

A contact herbicide effective in removal of hydrilla. Chelated copper-containing pesticides disrupt cell walls and alter proteins in the plant tissue. Effective as a backup control method used in conjunction with long-acting, systemic herbicides. The damage to the plant tissue from a chelated copper treatment could increase the efficacy of other herbicides.

Used at the Aurora site in Cayuga Lake (Figure 5) as a backup to the fluridone treatment. This treatment reduced the presence of hydrilla from 60% to 2% in the first year. This is an ongoing treatment.

California Department of Food and Agriculture (CDFA) uses copper in conjunction with fluridone treatment in their hydrilla eradication program in Clear Lake (Figure 6). As part of the treatment plan, copper is applied mid-season if plants are found.







Limitations: Historical use of copper within New York, however something occurred (Meredith can find backstory) years ago which caused the use of copper-containing herbicides to be restricted/banned. Broad-spectrum herbicide which will damage non-target plants if dispersed in water column and not applied directly to the hydrilla plant.

2. Endothall:

A systemic aquatic herbicide which inhibits photosynthesis and protein synthesis in targeted plants. Valuable herbicide in treatments which require short application times due to operational constraints.

Due to a high water exchange environment from the Niagara River, water movement impedes management plans. Operational constraints allow short blocks of time to apply herbicides. At the Erie Canal a treatment window of only 48 hours was possible. The application of endothall occurred over four years and reduced the presence of hydrilla from 40% down to 1%.

One of the two best options out of 26 management options the D & R Canal management team considered. Endothall was included as a backup in the plan along with hydro-raking, to support the fluridone treatments.

Limitations: More toxic than copper or fluridone. Drinking water MCL 0.1 mg/L.

3. Fluridone:

A systemic aquatic herbicide which damages carotenoid and chlorophyll pigments crucial to photosynthesis. Effective herbicide in low dose – long term applications.

Fluridone is used as the primary treatment method in the D & R Canal, which has five drinking water intakes and two intakes for irrigation. Because of the density of the infestation, fluridone was the best option. The Aurora site at Cayuga Lake is the water supply for a small municipality. Fluridone was chosen due to the need for a longer acting systemic chemical treatment.

There has been no recorded bioaccumulation in plants, no direct impact on fish or other non-target species. Because it is a long acting treatment (90 days), the nutrient release from the dying plants is lower impact than that of fast acting herbicides.

Limitations: Raw water intakes off of the New Croton Reservoir (if any) might be problematic for non-drinking water purposes. Water mixing lowers effectiveness of the treatment.

New Croton Reservoir Constraints

- New Croton Reservoir is at the bottom of system. There is very little control over elevation of
 water in the reservoir. Because the levels fluctuate, the tubers can be in deeper water and
 difficult to access for periods of time.
- 2.7% fluridone, pellet, 5x 7/1-9/30, 2ppb. NY MCL = 50ppb. Can be applied around intakes, **but not during pilots**.
- Goal of eradication 5-10 years, however the Reservoir needs to be at full capacity for the duration of the 2018, 2019, and 2020 Catskill Aqueduct cleaning and the 2022-2023 RWBT shutdown. The reservoir cannot be drawn down.







- Potential impact on Croton River NYSDEC hydrilla management plan. NYSDEC Article 15 permit
 applied for annually. Upstream source of the herbicide might complicate matters in the
 application process each year.
- Reintroduction: Excursions of the plant through the entire system of reservoirs and water ways, waterfowl, boating.
- Limitations in the pesticide permitting process: native vegetation, drinking water, irrigation crops, livestock watering, low concentration material over long period time. Complications in the ongoing monitoring of the permit.
- Size of reservoir and budget limitations for survey limited the survey to one week instead of three weeks that it would likely take to survey the 36 miles of shoreline.

Monitoring

- Water quality monitoring to inform the utility and end users
- Water quality monitoring to inform decisions moving forward, i.e. how long to retain certain concentration throughout the project area
- Plant and tuber monitoring to determine the timeline of the plants' responses to the treatments

There are several constraints when regarding water quality monitoring. Details of the logistics in sampling, analysis, turnaround time impact the efficacy of program. These constraints should be considered in determining the frequency of monitoring necessary. There are no guidelines for monitoring.

- Croton River monitoring was determined by threshold level.
- Aurora site at Cayuga Lake: daily monitoring
- D & R Canal: weekly monitoring of plant. Now it is less frequent.

Water quality monitoring for drinking water samples are constrained by laboratory turnaround times. These tests will provide a lower detection limit. The average turnaround is 3-4 days, but it has been delayed up to 5-10 days. Problematic considering that people will already be drinking the water. Fast tests are available but with higher detection limits. The lower limit of a fast test is 1ppb, while the lower limit of the laboratory test is 0.29ppb. There is currently one chemist at an accredited laboratory in Connecticut which is used regionally. D&R Canal submitted samples and the variability in testing was observed up to 40% with duplicate testing using differing methodologies.

Outreach

 D & R Canal: Prior to the treatment, two meetings were held with stakeholders. Contacted the NJDEP and reached out to all mayors, elected officials of the towns the Canal runs through. A FAQ sheet was prepared and educational signage was posted at over 100 locations. In addition, a website was created for the treatment. Surface water sample results were posted 24-48hrs after received.

They provided a script to all people potentially getting phone calls about the treatment program. Information on sampling efforts and results was sent daily for first month and half to all users. Two newspaper articles published (New Brunswick) both with a positive spin. They







received no negative feedback from the season and a lot of positive feedback received on local and national scale.

Feedback from the public included a request for a fluridone emergence response plan. The plan was effective in assuaging concerns.

- 2. Cayuga Lake: Put emphasis on public outreach. Hydrilla happy hours open to anyone interested were held at a local establishment impacted by the management plan. Some negative feedback from a Cornell professor writing editorials against the project. To address his concerns, he was invited to the public meetings. He attended and that issue was resolved.
- 3. Croton River: Very little pushback received from the public because of the amount of transparency given to public. The 5th public stakeholder meeting will be hosted in January providing as much info as possible on what has happened and what modifications are coming. A letter distribution goes out to all of the riparian owners before the application begins. DEC is willing to provide public outreach assistance for DEP.

DEP will likely have to work more closely with Ossining because the DEC wasn't impacting their drinking water directly and the town wasn't interested in involvement.

DEC didn't provide any more information than what was presented today on toxicological concerns, and it was acceptable. Diving into the EPA toxicology numbers started to go over people's heads.

4. Learning from emerging contaminant projects: best way to communicate this information is to flip the information. Ex: state how many glasses of water you would have to drink before it impacted human health.

No Action Alternative

The implications of a no action alternative range could mean increased risk to human health, higher water utility rates, and ecological degradation. After the discovery of hydrilla in the Eno River in North Carolina, there was a five-year delay from first meeting held until action was taken to manage the infestation. During this time, it spread a mile per year for each year in that time. The amount of hydrilla nearly double in those five years. Surveys in the Croton River showed an increase of 60% growth between 2015 and 2016.

Unmanaged hydrilla poses a risk to our public drinking water supply. Dense mats of hydrilla can cause a reservoir to lose capacity to hold its maximum volume. In addition, the plants can block drinking water intakes and clog the UV used to treat the water. If left unmanaged in the Croton system, the plant can migrate to some of the smaller reservoirs in the system impacting more of the water supply. If the plant reaches the Catskill / Delaware system, it can deeply impact the main drinking water source. All of aforementioned risks can lead to higher water rates for the consumer, and potentially decrease access to potable water.







The rapid growth of the plant can out compete native plant species, lead to eutrophication of the water system, and alter the water quality. Hydrilla is now in the New Croton Reservoir and the Croton River. The Croton River leads to the Hudson River and there are concerns of an infestation establishing in hospitable locations, and ultimately spreading to tributaries along the river.

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ABBREVIATIONS

ALS Acetolactate synthase

AOP Advanced Oxidation Processes

AWWA American Water Works Association

BAF Biologically active filtration

CADBW California Division of Boating and Waterways

CDMS Crop Data Management Systems

cfs cubic feet per second

D&R Delaware and Raritan

DASH Diver-assisted suction harvesting

DBP Disinfection byproducts

DEP New York City Department of Environmental

Protection

EIS Environmental Impact Statement
EPA US Environmental Protection Agency

FIFRA Federal Insecticide, Fungicide and Rodenticide Act

ft Feet

FWC Florida Fish and Wildlife Conservation Commission

GEIS Generic Environmental Impact Statement

IFAS University of Florida, Institute of Food and

Agricultural Sciences

LPHO Low-pressure high-output

MCL Maximum contaminant level MCLG Maximum contaminant level goal

mg/L Milligrams per liter

NCBI National Center for Biotechnology Information NEANS Northeastern Aquatic Nuisance Species Panel

NOM Natural organic matter

NYS New York State

NYSDEC New York State Department of Environmental

Conservation

O3 Ozone

ppb Parts per billion ppm Parts per million

SAV Submerged Aquatic Vegetation

SEIS Supplemental Environmental Impact Statements

SEQRA State Environmental Quality Review Act

SWP Source water protection

TAMU Texas A&M University

USACE US Army Corps of Engineers USFWS US Fish and Wildlife Service

USGS US Geological Survey UV Ultraviolet Light

WFP Water Filtration Plant WTP Water Treatment Plant

PLANNING AND ENGINEERING DEPARTMENTS

Sent to:
TBITAITC
HISPAIN

Telephone (914) 277-5366 Fax (914) 277-4093 Town of Somers

WESTCHESTER COUNTY, N.Y.

SOMERS TOWN HOUSE 385 ROUTE 202 SOMERS, NY 10589 www.somersny.com

Steven Woelfle
Principal Engineering Technician
swoelfle@somersny.com



Date:

April 15, 2021

To:

Director of Finance T10(914)

From:

Steven Woelfle

Engineering Department

RE:

Erosion Control Bond 5W

New York American Water Company/Willow's HOA

Wetland Permit #W2021-12

TM: 16.16-2-21

Attached is a check in the amount of \$500.00 posted by American Water, 1 Water Street, Camden, NJ 08102 in payment of an Erosion Control Bond for NYAW Company/Willows HOA Wetland Permit.

Att.

CC:

Town Board Town Clerk Sent to: TB, TA, TC 4/27/21

PLANNING AND ENGINEERING DEPARTMENTS

Telephone (914) 277-5366 Fax

Town of Somers

WESTCHESTER COUNTY, N.Y.

SOMERS TOWN HOUSE 335 ROUTE 202 **SOMERS, NY 10589** www.somersny.com

(914) 277-4093



Steven Woelfle Principal Engineering Technician swoelfle@somersny.com

Date:

April 26, 2021

To:

Town Board

From:

Steven Woelfle $\lesssim \omega$

Engineering Department

RE:

Somers Realty Subdivision Phase 3

Clayton Blvd, Halstead Street, Hoyt Street, Columbus Street

Release of Maintenance Bond

It has been more than one year since the dedication and satisfactory completion of the improvements for Somers Realty Subdivision Phase; therefore, this office has no objection to the release of the Maintenance Bond No. 107207541 in the amount of \$303,200.

SW/wg

cc: Town Clerk Director of Finance Highway Superintendent Angel Franzen, AvalonBay Sent to:
TBITAITC

4/23/21

1

INTEROFFICE MEMORANDUM

TO:

TOWN SUPERVISOR AND MEMBERS OF THE TOWN BOARD

FROM:

SENIORS DEPARTMENT DIRECTOR, BARBARA TABERER

SUBJECT:

2021 TRANSPORTATION CONTRACTS

DATE:

APRIL 20, 2021

CC:

TOWN CLERK AND FINANCE DIRECTOR

Seniors Department Director, Barbara Taberer respectfully requests the Town Supervisor execute the State Transportation Services contract PY April 1, 2021 through March 31, 2022.

Also please execute IIIB Transportation Services contract for the PY – January 1,2021 through December 31, 2021.

See attached letters of intent.



Company Company

legationent of Sonia, in grams and Services

Can: 1-81

April 19, 2021

Ms. Barbara Taberer
Director Somers Nutrition Program
Town of Somers
Wayne Van Tassel Memorial Park
P.O. Box 236
Lincolndale, NY 10540

RE: Title III-B Transportation Services Contract, PY 2021

Dear Ms. Taberer:

Attached is an electronic blank copy of the Title III-B Transportation Services contract. The contract is comprised of an Agreement and Schedules "A", "B", "C", "D", "E" and "F" to cover the program period commencing on January 1, 2021 and continuing through December 31, 2021. Funding for the program will be in an amount not to exceed \$3483 for actual services provided and data entered in the NYSOFA Client Statewide Data System (PeerPlace) with the Town of Somers required to contribute \$2420 in matching funds to the Program. The Department may reduce the amount payable to its contractors if the New York State Office for the Aging reduces the Department's Federal and/or State funding, in which case you will be notified. It should be noted that the Board Act authorizing the County to enter into agreement with your municipality is pending the approval of the Westchester County Board of Legislators. This means that although your municipality can sign off on the agreement that Commissioner Carpenter cannot do so until the required approval has been granted.

You MUST use the original contract documents that we have provided. NO ALTERATIONS may be made to the contract without the prior consent of the Dept. With the exception of the applicable Excel Pages, DO NOT fill out the contract electronically as we want to maintain the integrity of the document. Noncompliance with these requests will result in the contract returned to your agency. We recommend that you keep a blank copy of the contract in the event that you need to reprint a page.

Fax: (914)813-6399 Website: www.westchestergov.com

Printout a hard copy of the contract and fill it out making sure that where signatures are required on all documents that they are original. Return the ENTIRE originally signed contract to me at the address in the footer below. Contracts with COPIED signatures are unacceptable. We also suggest that you keep a completed copy of the contract for your records.

Please refer to the "Standard Insurance Provisions" on pages 1 and 2 of Schedule "A" for detailed information regarding ALL required insurances. Contracts will be on hold pending receipt of any missing insurance form. Remember to list Westchester County as an Additional Insured on the Certificate of Liability Insurance.

Transportation Program Contractors are required to mail in the completed PeerPlace MONTHLY REPORT signed by the staff member responsible for the report. The reports should be received by the County no later than the tenth (10th) day of the following month. The County reserves the right to withhold payment to Contractor for its failure to submit the monthly report by the deadline until the monthly report is received by the County.

Please direct program-related questions to your program liaison Meleita Jones at 914-813- 6420, or via email at mmf2@westchestergov.com. You may also contact me at 914-813-6058 or via e-mail at ssj3@westchestergov.com for questions pertaining to the processing of the contract.

Sincerely,

Sharon Johnson Program Administrator

Sharon Johnson

Encl.



Course Latimer County Executive

Department of Semi Programs and Services

М... Сап

April 19, 2021

Ms. Barbara Taberer
Director Somers Nutrition Program
Town of Somers
Wayne Van Tassel Memorial Park
P.O. Box 236
Lincolndale, NY 10540

RE: State Transportation Services Contract: PY 2021 - 2022

Dear Ms. Taberer:

Attached to the e-mail that was sent with this letter is a blank copy of the New York State Transportation Program contract, comprised on an Agreement and Schedules "A", "B", "C" and "D" for the program period commencing on April 1, 2021 through March 31, 2022. State funding for program will be in an amount not-to-exceed \$1962 Please be advised that the Department may reduce the amount payable to its contractors if the New York State Office for the Aging reduces the Department's federal and/or state funding, in which case you will be notified. It should be noted that the Board Act authorizing the County to enter into agreement with your municipality is pending the approval of the Westchester County Board of Legislators. This means that although your municipality can sign off on the agreement that Commissioner Carpenter cannot do so until the required approval has been granted.

You MUST use the original electronic contract documents that we have provided. Please print a copy of the contract and fill it out making sure that where signatures are required on all documents that they are original. Contracts with COPIED signatures are unacceptable. Additionally, NO ALTERATIONS may be made to the contract without the prior consent of the Department of Senior Programs and Services. With the exception of the applicable Excel Pages, DO NOT fill-out the contract electronically as we want to maintain the integrity of the document. Non-compliance with these requests will result in the contract returned to your agency. We also recommend that you keep a blank copy of the contract in the event that you need to reprint a page and also keep a completed copy of the agreement for your records.

Mount Vernon, New York 10550-3414 Telephone: (914)813-6400 Fax: (914)813-6399 Website: www.westchestergov.com

Return the ENTIRE completed originally signed agreement and all supporting schedules to me at the address in the footer below.

Please refer to the "Standard Insurance Provisions" in Schedule "B" for detailed information regarding ALL required insurances. Contracts will be on hold pending receipt of any missing insurance form. Remember to list the County of Westchester as "Additional Insured" on the Certificate of Liability Insurance. ALL required insurances should be submitted with the contract, or the contract will be on hold pending receipt of these documents

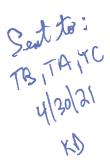
Please direct program related questions to your program liaison Meleita Jones at 914-813-6420. Questions pertaining to the processing of the contract should be directed to me at 914-813-6058.

Sincerely,

Sharon Johnson

Program Administrator

Share Johnson



Opt-out of Adult Use Cannabis Retail Dispensaries and On-Site Consumption Sites

Local Law No _	of the year 2021
Town of Somers,	County of Westchester

A local law to amend the Code of the Town of Somers to add Chapter 124 to opt out of allowing cannabis retail dispensaries and on-site consumption sites as authorized under NYS Cannabis Law Article 4

Section 124-1. Legislative Intent

It is the intent of this local law to opt out of allowing cannabis retail dispensaries and on-site cannabis consumption sites in the Town of Somers that would otherwise be allowed under NYS Cannabis Law Article 4.

Section 124-2. Authority

This local law is adopted pursuant to NYS Cannabis Law § 131 which expressly authorizes the Town Board to adopt a local law requesting the Cannabis Control Board to prohibit the establishment of cannabis retail dispensary licenses and/or on-site consumption licenses within the jurisdiction of the town and is subject to a permissive referendum, the procedure of which is governed by Municipal Home Rule Law § 24.

Section 124-3. Local Opt-Out

The Town Board of the Town of Somers hereby opts out of allowing cannabis retail dispensaries and on-site cannabis consumption sites from being established and operated within the town's jurisdiction.

Section 124-4. Severability.

If any clause, sentence, paragraph, subdivision, or part of this Local Law or the application thereof to any person, firm or corporation, or circumstance, shall be adjusted by any court of competent jurisdiction to be invalid or unconstitutional, such order or judgment shall not affect, impair, or invalidate the remainder thereof, but shall be confined in its operation to the clause, sentence, paragraph, subdivision, or part of this Local Law or in its application to the person, individual, firm or corporation or circumstance, directly involved in the controversy in which such judgment or order shall be rendered.

Section 124-5. Permissive Referendum/Referendum on Petition

This local law is subject to a referendum on petition in accordance with NYS Cannabis Law § 131 and the procedure outlined in Municipal Home Rule Law § 24.

Section 124-6. Effective date.

This local law shall take effect immediately upon filing with the Secretary of State.