**Representative Policy Board**
**Land Use Committee**
**South Central Connecticut Regional Water District**
Lake Hammonasset, 701 Old Toll Rd. (Rte. 80), Killingworth

# AGENDA

**Regular Meeting of Wednesday, June 9, 2021 at 5:30 p.m.**

1. Safety Moment
2. Approval of Minutes – May 12, 2021 meeting
3. Lake Hammonasset Property Update: J. Triana
4. Consider and act on recommendation to the Representative Policy Board re: Completeness and mode of the Authority's Application for a Non-Substantial Land Use Plan Amendment to create new trails on Authority Property at Lake Chamberlain in Bethany
5. Updates on other land and RWA properties, including invasive species update
6. Other Land items
7. Notification of Committee Chair Election - July 2021
8. Next Regular Meeting: Wednesday, July 14, 2021 at 5:30 p.m.
9. Adjourn

** In order to comply with social distancing requirements, the South Central Connecticut Regional Water Authority is asking attendees to remain outdoors, keep a 6' distance and wear masks or face coverings. Driving together to the meeting is not encouraged.

In the event of rain, the meeting will be held remotely. For information on attending the meeting, via remote access and to view meeting documents, please visit https://www.rwater.com/about-us/our-boards/board-meetings-minutes?year=2021&category=1435&meettype=&page=. For questions, contact the board office at jslubowski@rwater.com or call 203-401-2515.

**IN THE EVENT OF RAIN, THE MEETING WILL BE HELD REMOTELY. BELOW IS THE INFORMATION TO ATTEND VIA CONFERENCE CALL. PLEASE CONTACT JENNIFER SLUBOWSKI AT THE BOARD OFFICE (203) 401-2515 WITH ANY QUESTIONS.**

**Topic: RPB Land Use Committee Meeting**

Time: Jun 9, 2021 05:30 PM Eastern Time (US and Canada)

Join Zoom Meeting *(via conference call)*

Dial by your location

+1 646 876 9923 US (New York)

+1 301 715 8592 US (Washington DC)

+1 312 626 6799 US (Chicago)

+1 346 248 7799 US (Houston)

+1 408 638 0968 US (San Jose)

+1 669 900 6833 US (San Jose)

+1 253 215 8782 US (Tacoma)

Meeting ID: 892 4377 3795

Passcode: 331859

Find your local number: https://us02web.zoom.us/u/kdXaZFJk6H

# SAFETY MOMENT

Tap Into Safety

Regional Water Authority

## NATIONAL TRAILS DAY

June 5, 2021 was named the American Hiking Society's National Trails Day. It is dedicated to a day of service and advocacy for hometown trails.

Millions of people have found physical, mental, and emotional restoration on trails during the pandemic. Let's return the favor and care for America's magnificent trails systems and ensure everyone is the U.S. can enjoy trails and natural areas, not only on June 5th but throughout the year.

Actions that make a difference:

- Commit to trail service this year
- Speak up – Tell your Member of Congress to Co-Sponsor the Transit to Trails Act (H.R. 2924/S1461)
- Leave a trail better than you found it
- Give a gift
- Recreate responsibly

Service – Teamwork – Accountability – Respect – Safety

Regional Water Authority

**UNAPPROVED DRAFT**

**Representative Policy Board**
**Land Use Committee**
**South Central Connecticut Regional Water District**

**Minutes of May 12, 2021 Meeting**

The regular meeting of the Land Use Committee of the Representative Policy Board of the South Central Connecticut Regional Water District ("RWA") took place on Wednesday, May 12, 2021 at 257 Fenn Road, Cheshire, Connecticut. Chair Betkoski presided.

| | |
|---|---|
| Present: Committee Members: | P. Betkoski, P. DeSantis, B. Eitzer, R. Harvey, M. Horbal, M. Levine, G. Malloy, J. Oslander and J. Mowat Young |
| RPB: | T. Slocum |
| Authority: | D. Borowy |
| Management: | T. Norris, J. Triana, N. Smith |
| Cheshire Land Trust: | D. Schrumm and S. Simone |
| Town Manager: | S. Kimball |
| RPB Staff: | J. Slubowski |

Chair Betkoski called the meeting to order at 5:30 p.m. He reviewed the Safety Moment distributed to members.

On motion made by Mr. Malloy, seconded by Mr. Horbal, and unanimously carried, the Committee approved the minutes of its April 14, 2021 meeting.

On motion made by Mr. Harvey, seconded by Ms. Young, and unanimously carried, the Committee approved the minutes of its April 19, 2021 meeting.

Mr. Triana, the RWA's Real Estate Manager, introduced members of the Cheshire Land Trust (CLT) and Mr. Kimball, Cheshire Town Manager, who provided information about 257 Fenn Road in Cheshire, formerly known as the Ricci property, which included:

- Historical/settlement information
- RWA and CLT owned property and easement
- Preservation
- Grant assistance
- Acreage

Mr. Triana stated that the RWA and the CLT both hold easements on the property for the sole purposes of land preservation and protection of the public water supply. He reported that the property will be open for hiking and recreation to the residents of Cheshire.

At 4:45 p.m., Mr. Levine entered the meeting.

Discussion took place regarding property name, ownership, easements, and watershed preservation.

At the end of the discussion Mr. Triana introduced Ms. Smith, the RWA's Natural Resources Analyst, whose effective date of employment at the RWA was April 19, 2021.

Update on *The Land We Need for the Water We Use Program* – J. Triana reported:

Reservoir Levels (Percent Full)

| | Current Year | Previous Year | Historical Average | Drought Status |
|---|---|---|---|---|
| April 30, 2021 | 98 | 99 | 94 | None |

Rainfall (inches)

| | Current Year | Previous Year | Historical Average |
|---|---|---|---|
| April 2021 | 3.59 | 5.70 | 4.27 |
| Fiscal YTD (6/1/20 – 4/30/21) | 37.18 | 46.01 | 42.63 |

Land We Need for the Water We Use Program (Dispositions/Acquisitions)

- Durham - Corresponded with property owner of 16+/- acres.
- Killingworth – Corresponded with a property owner of 4+/- acres.

Hamden, Olin property option – FMA approved the transfer of the option. Sent draft of the transfer to HLCT and their attorney for review.

Hamden, Skiff St. ACES condemnation – Murtha contacted the AG's office. Noted we were notified since we had an interest in the ACES property.
North Branford, Beech St. and Pomps La. parcels (NB 4A and p/o NB 4) – Continued to discuss these parcels with the interested party.

Guilford and Madison (GU 21 and MA 2A) – Discussed Class III land with member of the Guilford Sportsman Association.

Rental houses:

- Hamden, 95 Ives St. (HA 13) – LUC found application to be complete. RPB scheduled public hearing for June 17th. Sent letters to required parties.
- Hamden, 233 Skiff St. (HA 9A) – Corresponded with Town Attorney about condemnation of areas they worked on beyond the plans.
- Woodbridge, 1029 Johnson Rd. – Discussed status of the house with Amity-Woodbridge Historical Society. Corresponded with owner about plans.
- Woodbridge, 2040 Litchfield Tpk. – Met with the owners about the deed restrictions, access easement, and historical conservation easement. Issued letter indicating all the items that need to be addressed including the un-approved solar panels and the missing faux chimney. Gave them until Sept. 1st to install the chimney. Solar panels could stay, but may need to be adjusted to allow room for the faux chimney.

Forestry Update

- Guilford – West of Sugar Loaf ash salvage (GU 4) – 40% complete
- Killingworth - East Hammonasset Leaf Screen Thinning, (KI 4) - Contract not yet awarded.
- Hamden - Overstory removal and Tornado Salvage, (HA 36) – Not started yet.
- Madison - Nathan's Pond Slash Wall Harvest (MA 6) – **5% complete.**
- Seymour - Silvermine Road Slash Wall Harvest (SE 9) – Awarded contract. Not started yet.
    - Met with CAES and NRCS to use a sprinkle infiltrometer to measure soil permeability and runoff in timber harvests.
    - Planted a new riparian buffer at Farm River-EH diversion.
    - Planted hundreds of Pitch Pine at the Lake Gaillard tunnel project for long-term erosion control.

- Completed forest inventory for East of North Chestnut Hill Road.

Recreation

- Hired Melanie Hennessey for the recreation staff.
- Trout stocking occurred at Maltby Lakes – 1800 fish with 12 being tagged. Three tagged fish were caught in April.
- Boating program opened for the season at Lake Saltonstall (April 10th).
- Acquired 5 kayaks for use at Lake Saltonstall. Added them to our inventory of vessels for anglers to rent.
- History walk at Maltby Lakes had 20 participants.
- Bird walk at Lake Saltonstall had 6 participants.
- Met CFPA and Rockland Preserve staff to look over Mattabesset Trail relocation in Madison.
- Met with Customer Service staff to discuss recreation updates and programs.
- Met with mountain bike planner at Genesee area to look at proposed route for one trail.
- Completed draft of Lake Chamberlain fishing trails and sent to others for review.

| | April | | March | |
|---|---|---|---|---|
| | 2021 | 2020 | 2021 | 2020 |
| Permit Holders | 6,502 | 4,479 | 6,336 | 4,049 |

Special Activity Permits

- Quinnipiac University (Professor Scott Davies)-Study bird nest boxes and record bird nesting activity and success, band the adults and chicks, and collect tissue samples for analysis during breeding season, Lake Chamberlain Recreation Area, the small mown field with lots of small cedars on the east side of Sperry Road just south of Lake Chamberlain where Patrick Leahy already has some boxes, Lake Watrous, and Lake Dawson, (04/07/21-12/31/21)
- Nicholas G. McDonald (Curatorial Affiliate Yale Peabody Museum, Author, Lecturer) – Geology research - Lake Saltonstall and Lake Gaillard (04/08/21-04/08/22)
- Quinnipiac University Department of Biological Sciences (Lisa Connelly, Senior Instructor) – Education/field trips for students; measure the health of the aquatic ecosystems that surround QU campus, Clark's Pond and Mill River, (04/09/2021-04/30/2021).
- University of Connecticut (Ms. Nancy Marek, Ph.D. Student) – drone flights to map locations of invasive understory shrub species; Japanese barberry, multiflora rose, Northeast quadrant of forested region near Lake Gaillard, (04/14/21 – 05/05/21)
- New Haven Bird Club, (Mr. Patrick T. Leahy)-Fall bird walk to observe species that are wintering on Lakes along the West River, Lake Bethany, Lake Watrous, and Lake Dawson, Bethany and Woodbridge, (10/16/21)

Other items

- Encroachments/agreements –
  - Agricultural fields – Signed license agreements with Potter for the 4 fields in north Guilford. Signed agreement with the Cave's to use the fields at Lake Gaillard around North St. for Christmas trees. Signed license agreement with Stewart to use field on Wiese Albert Rd., Haddam. Visited all western fields with Tanev to discuss expectations.
  - Killingworth, Bunker Hill Rd. (KI 9A) – Signed license agreement with Lally to use part of the field.
  - Killingworth, Emmanuel Church Rd. (KI 14 and KI 14A) – Discussed encroachment with staff from the Church.

- Killingworth, Rt. 148 (KI 14) – Discussed the encroachment with Jurewicz. Probably came from previous owners since they recently bought their property.
- Woodbridge, Sperry Rd. field (WO 5) – Urbano said she would continue with the Christmas tree license agreement
- Branford, Hilltop Dr. (BR 6) – Signed license agreement with the town for them to install a gate along the property line.
- Bethany, Bethany Horsemen – Signed new license agreement for use of the trails around Lake Chamberlain.
- Seymour, Seymour emergency radio (SE 1) – Received letter from town exercising option to renew the agreement for another 5 years.
- Seymour, ginseng request (SE 3) – Discussed possibility of allowing neighbor to grow and harvest ginseng on our property.
- Madison, Dead Hill Rd. (MA 4) – Spoke to abutter about trees taken down over the property line. Done in concert with a woodcutter who will pay for the wood.

- Invasive plants – Treated or documented invasive plant populations in East Haven, Hamden, Bethany, North Branford, Orange, and West Haven. Met with Nancy Marek to GPS ground control points and perform a drone mission related to identifying invasive species using drones. Discussed invasives management with Wallingford Water Dept. staff.

| | |
|---|---|
| Invasive Species Documented/ Mapped (ac) | 243 acres |
| Invasive Species Treated (ac/MH) | 26.5 acres |

- Personnel – Nicole Smith started as the Natural Resources Analyst on April 19th.
- Eli Whitney Museum – Continued to discuss license agreement that affords access to the site with EWM staff.
- East Haven, Virginia Rd. (EH 3) – Had Juliano find boundaries and reset pins for us to remark the boundary lines.
- North Branford/Guilford, Reeds Gap Rd. – Contacted by surveyor working on nearby property pointing out that a 0.5-acre parcel was attributed to us, but more likely owned by his client. Researched and agreed with his assumption. Contacted Guilford assessor's office to correct the matter.
- Hamden, LWWTP campus – Corresponded with girl scouts wishing to install bat boxes at the site.
- New Haven, East Rock Park access to Lake Whitney dam – Attended Park Commission meeting to discuss the easements that we would need to work on the dam.
- Pollinator gardens – RE staff assisted other RWA departments with installation of pollinator pathway gardens in multiple locations.
- East Haven, Beach Ave. – Decided to go ahead with acquiring the easements needed to install a depth main. Murtha will initiate a full title search of all the properties.
- Cell phone antennas – Discussed potential site in Cheshire with town staff and they were not in support, therefore we ended discussion with the cell phone company representative. Signed form for Crown Castle to add antennas at the Orange site for DISH network. This will eventually result in greater income from that site.
- Comcast lease, Burwell Tank site – Sent our comments to Comcast staff who were reviewing them.

Mr. Norris, the RWA's Vice President of Asset Management provided an update on the Prospect Dam. He reported that a leak was detected and the RWA has currently reduced the water level.

Mr. Triana reported that the committee is expected to visit the Eli Whitney Museum at its July or August meeting. More details to follow.

The next regular meeting of the committee is Wednesday, June 9, 2021 at 5:30 p.m.

At 5:21 p.m., on motion made by Mr. Malloy, seconded by Mr. Harvey, and unanimously carried, the meeting adjourned.

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Peter Betkoski, Chairman

***South Central Connecticut Regional Water Authority***
*90 Sargent Drive, New Haven, Connecticut 06511-5966 203.562.4020*
*http://www.rwater.com*

Date: May 20, 2021

To: Members of the Representative Policy Board
South Central Connecticut Regional Water Authority

Subject: Land Use Plan Amendment – Creation of new trails on Authority property in Bethany at Lake Chamberlain for Anglers

Ladies and Gentlemen:

The South Central Connecticut Regional Water Authority requests that the Representative Policy Board ("RPB") accept the following enclosed document as complete:

> Application for non-substantial amendment to the Land Use Plan to create new trails on Authority property at Lake Chamberlain in Bethany

Based on our conclusion that the proposed Land Use Plan amendment is in support of the goals of the South Central Connecticut Regional Water Authority and is in the public interest, we are further requesting that the RPB approve this action.

Any questions regarding this Application may be directed to Beth Nesteriak, Executive Vice President and Chief Operating Officer or John Triana, Real Estate Manager.

Sincerely,

South Central Connecticut Regional Water Authority

DocuSigned by:
BC99015B3EC142F...

David Borowy, Chair
Kevin J. Curseaden
Anthony DiSalvo
Catherine LaMarr
Suzanne C. Sack

Enclosures

**Request for Approval of Land Use Plan Amendment**

**Portion of BE 1**
**Lake Chamberlain, Bethany**

**Application to the Representative Policy Board (RPB)**
**From the Regional Water Authority**

**May 2021**

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## Application for an Amendment to Land Use Plan

The Regional Water Authority (Authority) requests that the Representative Policy Board approve the Land Use Plan amendment described in this application, in accordance with the provisions of Connecticut State Act No. 77-98, as amended. This application and its annexed materials meet the requirements set forth in Connecticut State Act No. 77-98, as amended, and the Rules of Practice of the RPB.

### I. Proposed Amendment

#### A. Type of Amendment

Creation of eight new trails at the Lake Chamberlain recreation area to allow additional access to the lake for anglers. The trails will only be for the passive recreational use of anglers and hikers. Approximately 0.37 miles total of trail will be created. Most of the trails are on Class I land as would be the case in order to provide access to the water for anglers. Many of the proposed trails are being used informally now. Part of the purpose of this Land Use Plan amendment is to formalize these trails and limit where anglers access outside of the recreation program. Because there will be no impact to the public water supply, this is amendment is being submitted as a non-substantial amendment.

#### B. Location

Town in which property is located: Bethany
Land Unit Number: BE 1
Land Use Plan System: West River System
(See Attachment A)

#### C. Objectives of Amendment

1) Create trails on Authority property on BE 1 to allow anglers greater access to Lake Chamberlain.
2) Limit the places where anglers now access the lake outside of the recreation program.
3) Add value to the recreation program to solicit new permit holders and increase the likelihood that existing permit holders renew their permits.

#### D. Watershed Classification of Affected Areas

Class I (acres): 0.37 acres
Class II (acres): 0.00 acres
Class III (acres): 0.00 acres

The entirety of the proposed trails is on Class I land.

E. Land Use Plan Classification

Land within the affected area falls under the Forest or Recreation designation. The entire edge of the lake is designated as Recreation. However, trails are not specifically designated in these areas.

F. Description of Proposed Amendment

The proposed amendment is to create eight trails across the Authority's property as noted above. Currently, the trails around the lake do not come close to the water over much of their lengths, though anglers have made unauthorized trails in several locations to get to the water at some locations. We are proposing to formalize these trails so that we can control where anglers get close to the water. See 'Attachment A' for a map showing the proposed trail.

II. Existing Environment

A. Watershed function

The area with the proposed trails are on Class I land. All of this drains into Lake Chamberlain, which is a storage reservoir in the West River System.

B. Physical/Biological

The subject area is covered by a forest of mixed hardwoods and conifers between the lake road and the waterbody. While some brush, trees, and limbs will be removed to facilitate casting by anglers, no root systems will be disturbed. The area's physical and biological resources are further explored in the Preliminary Assessment prepared by Evans Associates Environmental Consulting, Inc. See Attachment B - "Preliminary Assessment – Lake Chamberlain Fishing Spur Trail Improvements".

C. Present land use

The Land Use Plan designates the subject areas as Forest and Recreation. All of the Authority's property in this vicinity is forested.

D. Social/Political environment (including surrounding land use)

The land uses surrounding the Authority's affected parcel are residential and protected open space. The closest private property from any of the trails is 250 feet away. The closest house to any of the trails is over 500 feet away. The Bethany Land Trust holds easements over the properties to the north of Lake Chamberlain.

E. Cost of maintaining the land in its present use

The land unit in question has a total annual cost to the RWA of approximately $164,752. Security and maintenance of the property accounts for approximately $18,250 of the annual costs and, and PILOT accounts for $146,502 which includes the Lake Chamberlain dam.

## III. Environmental Impact Statement

### A. Summary of potential impact

As noted in the Preliminary Assessment (Attachment B), the potential impact to the environment is expected to be negligible and therefore this amendment is being submitted as a non-substantial amendment. The areas with the proposed trails are forested and will not be affected by the proposed trail. Proper placement and construction of the trails by the Authority will avoid any negative impacts.

### B. Impact on public water supply

The addition of the trails will not affect the public water supply. Several trails are already on the property and encircle Lake Chamberlain. We have not seen any impact to the public water supply due to their existence.

### C. Financial impact on the RWA

There will be no financial impact to the Authority due to the proposed amendment. The security, maintenance, and PILOT costs will remain the same as before the trail creation. The Authority has spent funds to prepare this Land Use Plan Amendment. Construction costs of the trails is also minimal. These costs are expected to be equal to the added revenue from new and renewing recreation permit holders.

## IV. Land Use Controls

### A. Conformity with Authority land use policies

The Land Use Plan states that the subject area is Forest and Recreation. There is no conflict in having a trail go through these areas.

### B. Conformity with other applicable plans

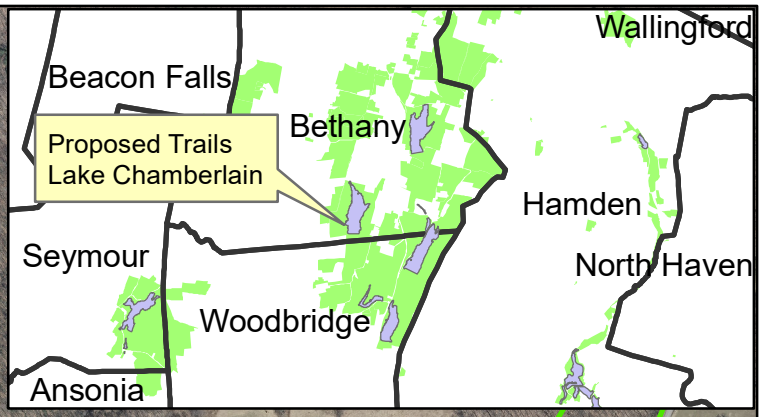
As noted in the Preliminary Assessment - Section H, the proposed trail conforms to the Conservation and Development Policies Plan for Connecticut, 2013-2018, the South Central Region: Plan of Conservation and Development 2018-2028, and the Bethany 2010 Plan of Conservation and Development.

## V. Authority's Final Evaluation and Recommendation

The Authority requests that this application, to establish eight new trails at Lake Chamberlain for anglers, be approved by the Representative Policy Board for the following reasons:

The creation of the trails on Authority property will not have an adverse impact on the water supply. Best management practices will be employed to further prevent any potential impact during the trails' construction. Additionally, the proposal should have no financial impact on the Authority. Finally, the new trails will enhance recreation permit holder's experiences and enjoyment at Lake Chamberlain.

# Regional Water Authority
# Land Use Plan Amendment - Attachment A
# Creation of Trails for Angler Access
# Lake Chamberlain
# Bethany
# May 2021




Old Mill Rd.

Sperry Rd.

Proposed Trails for Anglers (Yellow)

N 0 500 1,000 2,000 Feet

# PRELIMINARY ASSESSMENT

## Bethany - Lake Chamberlain Fishing Spur Trail Improvements

**Location: Regional Water Authority Lake Chamberlain property located in Bethany. The spur trail improvements would occur in 8 areas, adjacent to the lake shore, extending from existing marked and maintained recreational trails.**

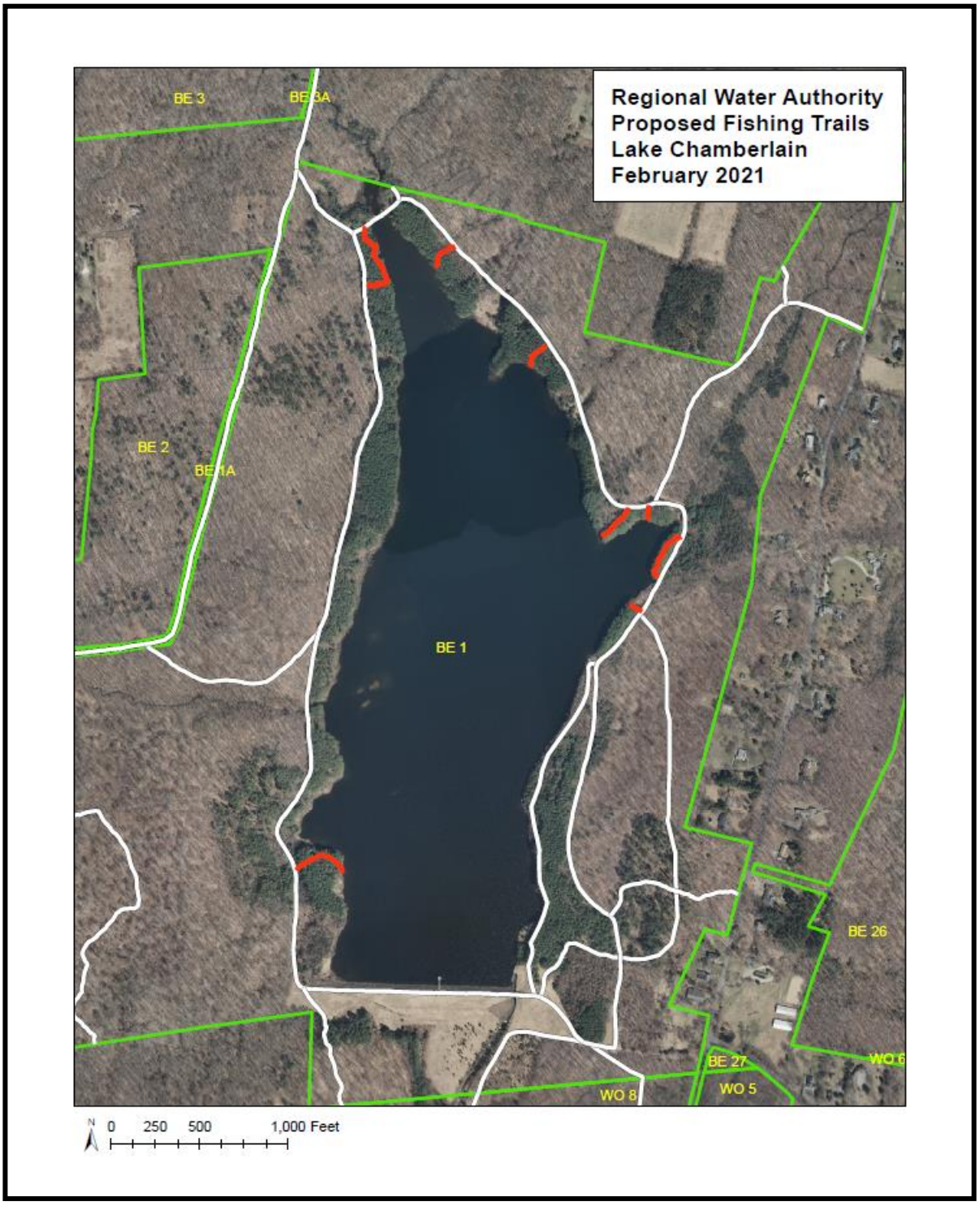
**Proposed Action:** The RWA Lake Chamberlain property contains several marked and maintained recreational trails that are open to RWA recreation permit holders. Some additional 'unofficial' spur trails have been created over time by people accessing the lake to fish. Fishing is allowed on this site (with proper permits). The RWA would like to make some of the 'unofficial' fishing spur trails permanent (marked and maintained) for lake access as well as to deter visitors from travelling through other, more sensitive areas near the shore in an attempt to reach the lake.

Some selective vegetation removal will occur, including cutting/removal of trees and shrubs (standing and/or fallen), when necessary, in the immediate vicinity of the spur trails. Cutting and/or trimming some live trees is proposed for safety reasons (safe passage/access to the lake) and to help anglers cast without getting lines caught in branches. Trees will be judiciously selected for removal, as it is understood that vegetation is a key component in water quality maintenance. Tree and vegetation removal will occur by hand (hand tools) or with chainsaws or brush saws. No heavy machinery will be used.

Eight spur trails are proposed to be made permanent, each beginning at an existing trail and ending at the lake, or forming a loop that begins and ends on an existing trail. The GPS locations of the proposed 8 spur trails (subject to minor changes) are shown in red on the aerial photo provided (next page). Existing trails are shown in white. Below: example of an unofficial trail to the lake edge.

**Study Prepared By: Evans Associates Environmental Consulting, Inc.**

**Date: February 3, 2021**




**Approximate locations of unofficial fishing-access spur trails proposed for improvements (in red). The existing marked and maintained trails, where spurs would begin and/or end, are shown in white.**

**Introduction**

This Preliminary Assessment form provides for consideration of potential impacts on specific aspects of the environment, subdivided into eight general areas:

A. Geology, Topography, Soils
B. Hydrology and Water Quality
C. Air Quality, Climate, Noise
D. Biotic Communities
E. Land Use
F. Natural Resources and Other Economic Considerations
G. Public Safety and Health
H. Community Factors

All phases of the proposed action are considered - planning, construction, and operation - as well as possible secondary or indirect effects. The proposed impacts for this project, although occurring within a large area, would be linear, and therefore minimal.

For each "yes" response, the indicated specific information is provided in the space for notes. Elaborations of negative responses may also be provided if appropriate (e.g., to indicate positive impacts on a given environmental factor); "no" answers for which explanatory notes are provided are indicated by an asterisk. Sources of information, including individuals consulted, are also listed in each section.

| A. Geology, Topography, Soils | Yes | No |
|---|---|---|
| 1. Is the site subject to geologic hazards (e.g., seismic, landslide)? If yes, specify type of hazard, extent, relative level of risk, whether or not the proposed action is vulnerable to damage from such hazard, and any measures included in the proposed action to avoid or minimize the risk of damage. | | X |
| 2. Will the proposed action create a geologic hazard or increase the intensity of such a hazard? If yes, specify the type of hazard, the extent to which it will be increased by the proposed action, and whether or not the proposed action can be modified to reduce the hazard. | | X |
| 3. Does the site include any geological features of outstanding scientific or scenic interest? If yes, describe the features and their relative importance, the extent to which they will be impacted by the proposed action, and any measures included in the proposed action to avoid or minimize damage to important geologic features. | | X |
| 4. Is the site subject to soil hazards (e.g., slump, erosion, subsidence, stream siltation)? If yes, specify hazards, their extent, the relative level of risk to the proposed action, and any measures included in the proposed action to avoid or minimize damage from soil hazards. | X | |
| 5. Does the site have any topographic or soil conditions that limit the types of uses for which it is suitable (e.g., steep slopes, shallow-to-bedrock soils, poorly drained soils)? If yes, specify the conditions, the of limitations on use, the extent to which the proposed action requires the use of such areas, and any measures included in the proposed action to minimize adverse impacts of these uses. | X | |
| 6. Does the site include any soil types designated as prime farmland? If yes, indicate the area of prime farmland soils and whether the proposed action requires any irreversible commitment of these soils to non-farm uses. | X | |

**Notes (including sources of information):**

## A. Geology, Topography, Soils

**A.4.** Erosion susceptibility is predicted in Connecticut for terrace escarpment type erosion. This prediction applies to areas of steep slopes, often alongside watercourses or drainageways, that have specific, easily disturbed soils. There are four levels of erosion classification, from most susceptible to least, as follows: Most Susceptible, Highly Susceptible, Surficial Materials Susceptible, and Soils Susceptible. See Attachments for Connecticut Environmental Conditions Online (CTECO) map of Erosion Susceptibility.

Portions of the site contain areas of 'Soils Susceptible' to erosion, the lowest class of erosion susceptibility. However, none of the proposed spur trails fall within these areas. In addition, the unofficial spur trails that are proposed for improvement have already been created and most are gently sloping or level, and are in areas dominated by pine trees (which provide a layer of needles on the ground). No areas of erosion were observed along any of the proposed spur trails. The final layout would take into consideration any steep sections, which only occur in a few areas, and for very short distances (mainly while descending down the side slopes from the existing trails). The spur trails will be narrow with minimal vegetation removal, and therefore large, open areas of soil would not be exposed. In addition, the spur trails would be completed in such a way that new areas of erosion and sedimentation, due to soil displacement by people or by concentrated rainfall runoff, are not created. For example, areas of the proposed spur trails that traverse a descent toward the lake could be guided through the woods in such a way that avoids steeply sloped areas. Part of the reason for improving the unofficial spur trails is to encourage users to follow a marked and maintained path, rather than create a path which may be a steep, direct line to the lake. A goal of the spur trail placement is to avoid steep, erodible areas, wetlands, and other sensitive areas, if present nearby.

**A.5.** Potential limitations to spur trail improvements and use include:

***Steep slopes:*** In most areas, the spur trails are mainly level to gently sloping. A few short areas, however, would pass through steeper areas. As discussed above (Note A.4.), impacts to any remaining steep slopes, mainly erosion and sedimentation, can be avoided with proper spur trail positioning.

***Shallow-to-bedrock soils:*** A few of the soil types on site contain, or may contain, shallow to bedrock soils or rock outcrops, however most soils on site have depth to bedrock of more than 20" (most are more than 200"). A spur trail would not pass directly over any steep, shallow to bedrock, or rock outcrop areas, and no impact would be expected from future passive-recreational use.

**Example of short length of spur trail that traverses an incline from the existing trail. This area may need to be avoided (re-routed) or strengthened (with trail enhancements such as steps) to protect it.**

**An area of rock outcrop located near the northeastern lake shore. The spur trail is proposed in the level area (rear of photo), not along the ridge.**

***Poorly drained soils***: The proposed spur trail improvements avoid all areas of poorly drained soils (wetland soils). See Attachments for CTECO map of Inland Wetland Soils. Spur trail improvements are proposed in order to keep visitors from traversing sensitive areas, including wetlands.

**A.6.** Some of the proposed spur trails would pass through areas mapped as Prime Farmland Soils. See Attachments for CTECO map of Farmland Soils. These areas are currently wooded and not used for farming, and likely would never be used as such. In addition, passive recreation would not negatively impact farmland soils.

**References:**

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/, Accessed 01/11/2021.

https://cteco.uconn.edu/viewer/index.html?viewer=advanced (Erosion Susceptibility, Inland Wetland Soils, and Farmland Soils maps). Accessed 01/14/2021.

| **B. Hydrology and Water Quality** | **Yes** | **No** |
|---|---|---|
| 1. Is the site located on a present or projected public or private water-supply watershed or aquifer recharge area?<br>If yes, specify the location, type, and volume of the water supply, the extent to which the proposed action involves construction or other use of the watershed or recharge area, and any measures included in the proposed action to minimize adverse effects on water supplies. | X | |
| 2. Does the proposed action create a diversion of water from one drainage basin to another or significantly increase or decrease the flow of an existing diversion?<br>If yes, specify the location, watershed area, and flow rates of the diversion, whether it involves a transfer of water between sub-regional drainage basins, the extent to which it will affect any required downstream flow releases and actual downstream flows, and the type and extent of expected impacts on the downstream corridor. | | X |
| 3. Does the site include any officially designated wetlands, areas of soils classified as poorly drained or somewhat poorly drained, or other known wetlands?<br>If yes, specify the extent and type of wetlands on the site and indicate whether the proposed action involves any construction, filling, or other restricted use of wetlands. | X | |
| 4. Will the proposed action seriously interfere with the present rate of soil and subsurface percolation?<br>If yes, specify the nature of the interference (compaction, paving, removal of vegetation, etc.), the extent to which the percolation rate will be hampered, and whether the project can be redesigned to minimize the interference. | | X |
| 5. Is the site located in a floodprone area?<br>If yes, specify the frequency and severity of flooding, the area of the site subject to inundation, and the relative level of risk; indicate whether the proposed action will be subject to damage from flooding, the anticipated amount and type of damage, and any preventive measures included in the proposed action to minimize flooding damage. | | X* |
| 6. Will the proposed action increase the effects of flooding, either on-site or downstream?<br>If yes, specify the anticipated amount and location of increased flooding, the estimated damage from this increase, and any measures included in the proposed action to minimize the risk of flooding. | | X |

| | |
|---|---|
| 7. Will the proposed action generate pollutants (pesticides, fertilizers, toxic wastes, surface water runoff, animal or human wastes, etc.)? If yes, specify the type and source of pollutant, amount of discharge by volume, and parts per million, and the relative level of risk to biotic and human communities. | X* |

**Notes (including sources of information):**

## B. Hydrology and Water Quality

**B.1.** The proposed spur trails would be located completely within Class I land within a public water supply watershed, as they are immediately adjacent to the lake. Lake Chamberlain is an upstream storage reservoir on the Sargent River. Recreational activities are limited by the conditions of permits issued pursuant to the regulations of the Department of Public Health (DPH). Approvals by the DPH assure appropriate uses of recreational watershed activities to avoid impacts to the water supply. Currently, permitted uses of the Lake Chamberlain property (for RWA recreation permit holders) include walking/hiking, cross-country skiing, jogging, lake fishing (with a Connecticut fishing license), and horseback riding.[1] The spur trail improvements will need approval by the DPH, as well as by the Representative Policy Board (the board that approved the Land Use Plan adopted by the RWA for making land-use decisions on their properties).

**B.3.** As noted in response A.5. (above), the proposed spur trails would avoid poorly drained and very poorly drained wetland soils.

**B.5.** The spur trails are located immediately adjacent to Lake Chamberlain, which is a storage reservoir. The water level in the lake is regulated by the dam and flow structures, so flooding is essentially prevented.

**B.7.** Increases in surface water runoff would not occur, as most areas proposed for the spur trails are level or gently sloping with good groundcover (including a layer of pine needles). In the few, short, steeper locations (mainly at the intersection with the main trail), surface water runoff from the proposed spur trails will be avoided through proper placement (see Note A.4.). Waste/trash produced during normal trail use would ideally be minimal or non-existent and would not pose a risk to biotic or human communities.

[1] Horseback riding is permitted on designated trails under a public program administered by the Bethany Horsemen Association, subject to conditions required by the RWA and the DPH.

| C. Air Quality, Climate, Noise | Yes | No |
|---|---|---|
| 1. Is the present on-site air quality below applicable local, state, or federal air quality control standards?<br>If yes, specify the extent to which the air quality fails to attain such standards and the potential effects of sub-standard air quality on the proposed action. | | X* |
| 2. Will the proposed action generate pollutants (hydrocarbons, thermal, odor, dust, or smoke particulates, etc.) that will impair present air quality on-site or in surrounding area?<br>If yes, specify the type and source of pollutants, the peak discharge in parts per million per 24-hour period, and the relative level of risk to biotic and human communities. | | X |
| 3. Is the site located in a high wind hazard area?<br>If yes, specify the range and peak velocity and direction of high winds; identify any features of the proposed action subject to damage from high winds, the relative level of risk, and any measures included in the proposed action to minimize wind damage. | | X |
| 4. Will the proposed action involve extensive removal of trees or other alteration of the ecosystem that may produce local changes in air quality or climate?<br>If yes, describe the nature and extent of the changes, potential adverse effects, areas likely to be affected, possible cumulative effects of removal of natural vegetation and addition of new pollutant sources, and any measures that could be included to reduce the adverse effects. | | X* |
| 5. Is the site subject to an unusually high noise level?<br>If yes, specify the sources of noise, the noise levels, and any measures included in the proposed action to minimize the effects of noise. | | X |
| 6. Will the proposed action generate unusually high noise levels?<br>If yes, specify the source of noise, the range of noise levels, and any measures incorporated into the project to minimize generation of, or exposure to, excessive noise levels. | | X |

**Notes (including sources of information):**

## C. Air Quality, Climate, Noise

**C.1.** In accordance with the Clean Air Act, the Environmental Protection Agency (EPA) Office of Air Quality Planning and Standards (OAQPS) has set national Ambient Air Quality Standards for six principal pollutants, which are called "criteria" pollutants. These pollutants are ozone ($O_3$); particulate matter (<10 micrometers in diameter-$PM_{10}$ or < 2.5 micrometers in diameter-$PM_{2.5}$); sulfur dioxide ($SO_2$); nitrogen dioxide ($NO_2$); carbon monoxide (CO); and lead (Pb). Locations throughout Connecticut are not in attainment with the standards set for ozone.[2] Therefore, the subject site also does not meet these standards. Current site use does not contribute to the ozone pollutants, however, and improvements to the spur trails also would not have any impact upon air quality.

**C.4.** A limited number of individual trees will be removed and/or trimmed to allow use of the proposed spur trails. However, the tree removal will be minimal and will not negatively impact air quality.

[2] Air quality information and reports found at: https://portal.ct.gov/DEEP/Air/Monitoring/Air-Quality-Summary-and-Trends and https://portal.ct.gov/DEEP/Air/Monitoring/Air-Monitoring-Network

| D. Biotic Communities | Yes | No |
|---|---|---|
| 1. Are there any rare or endangered plant or animal species on the site? If yes, specify the species, the degree of rarity, and the estimated population on the site; indicate the extent to which the proposed action will disturb the species and its habitat, and specify any measures included in the proposed action to minimize such disturbance. | X* | |
| 2. Are there unusual or unique biotic communities on the site? If yes, specify type of community and its relative significance; indicate the extent to which the proposed action will destroy significant biotic communities and specify any measures included in the proposed action to minimize such damage. | X | |
| 3. Is the site used as a nesting site by migrating waterfowl, or is it critical to the movement of migratory fish or wildlife species? If yes, specify the species, the extent to which nesting or migration will be disturbed as a result of the proposed action, and any measures included in the proposed action to minimize disturbance. | X* | |
| 4. Does the proposed action significantly reduce the amount, productivity, or diversity of the biotic habitat? If yes, specify the amount and types of habitat lost, types of wildlife or plants likely to be seriously affected by the proposed action, and any measures to mitigate impacts on biotic communities. | X | |

**Notes (including sources of information):**

## D. Biotic Communities

**D.1.** The CT Department of Energy and Environmental Protection (DEEP) maintains a Natural Diversity Data Base (NDDB), depicted on a set of maps that indicate the presence of Endangered, Threatened, and species of Special Concern. The NDDB map for Bethany[3] was reviewed, and one area of the subject site was depicted with hatching, indicating that listed species are present within or near the area. See Attachments for CTECO map of the Natural Diversity Database results. The proposed spur trails are not located within the hatching shown on the NDDB map. However, because this hatching is located within the site boundaries, a request was made to DEEP for more information.

There are no rare or endangered species on site, however, the response letter from DEEP (NDDB Determination Number: 202100560),[4] dated January 27, 2021, states that according to their records, there is a State-listed, Special Concern species (RCSA Sec. 26-306)

[3] Department of Energy and Environmental Protection – Natural Diversity Data Base: https://www.depdata.ct.gov/naturalresources/endangeredspecies/nddbpdfs.asp (*Natural Diversity Data Base Areas, Bethany, CT*, map updated December 2020); also found at: https://cteco.uconn.edu/viewer/index.html?viewer=advanced (Natural Diversity Database map). Accessed 01/14/2021.

[4] The DEEP determination is good for 2 years.

documented on site: Easter Box Turtle *(Terrapene carolina Carolina)*. The DEEP letter (included in the Attachments) details the habitats of these species, threats to their survival, and protective measures to follow to safeguard the species. DEEP recommendations include consulting with biologists to plan the recreational trail paths so they minimize the effect on this species. Additionally, the following best management practices along trails need to be considered:

- To avoid collection by the public, do not post signs alerting the public to the presence of this species.
- Litter from recreation can pose a choking hazard. Ensure there is a plan for how garbage will be managed.
- It is very important to route recreational trails away from **nesting areas**.

Turtle nesting areas are often fields or residential yards, areas where the nest will get sunlight throughout the day to incubate the eggs. Female turtles prefer patches of bare sandy soil when available.[5] However, for nesting, Eastern Box Turtles may also utilize early successional fields, meadows, utility right of ways, woodland openings, roadsides, cultivated gardens, residential lawns, mulch piles, beach dunes, and abandoned gravel pits.[6]

Because the spur trails are already unofficially established (through existing use), and are wooded (with the exception of where they meet the very edge of the lake), it is unlikely that turtles would choose to nest along the trails. If sunny areas of loose sand or soil are noted along or near the spur trails, the trails can be re-routed away from any potential nesting areas. No motorized vehicles will be permitted on the spur trails, visitors are limited to RWA recreation permit holders, and picnicking is prohibited. These regulations will reduce potential impacts to Eastern Box Turtles, should they be found in the vicinity of the spur trails. In addition, a biologist (Beth Evans of Evans Associates) is familiar with the site and has walked the trails. No potential nesting habitat was observed near the proposed spur trails.

**D.3.** Birds and other wildlife likely use the site for nesting and/or migration. Waterfowl nesting is likely limited to areas north of the causeway, however, where the vegetation offers better protection. No spur trails are proposed north of the causeway. Improving the spur trails should not negatively impact the wildlife species on site.

[5] https://www.mass.gov/guides/turtles-of-massachusetts#-turtle-nesting-

[6] https://www.mass.gov/files/documents/2016/08/uw/terrapene-carolina.pdf

**Area north of causeway, with better vegetative cover for waterfowl (above).**
**Area south of causeway with limited protective cover for waterfowl nesting (below).**

| **E. Land Use** | **Yes** | **No** |
|---|---|---|
| 1. Does the site include any officially designated historic or archaeological sites, or other sites of known historic, archaeological, or cultural significance?<br>If yes, specify their type and significance, the extent to which they will be disturbed by the proposed action, and any measures to reduce such disturbance. | | X* |
| 2. Does the site have any outstanding scenic or aesthetic characteristics, especially as viewed from public highways or recreation areas?<br>If yes, specify the type and significance of scenic features, the extent to which they will be disturbed by the proposed action, and any measure to reduce the extent of such disturbance. | | X* |
| 3. Is the site presently used for recreation?<br>If yes, indicate the type of recreation, the amount of use, and the extent to which the proposed action will interfere with present recreational uses or limit recreation options on the site. | X | |
| 4. Is the site presently used for residence or business?<br>If yes, specify the type of use and the extent to which the proposed action will displace present occupants, especially disadvantaged persons or businesses, and any measures included in the proposed action for relocation of such occupants. | | X |
| 5. Will the proposed action break up any large tracts or corridors of undeveloped land?<br>If yes, specify the area of undeveloped land surrounding the site, the amount of development the proposed action will involve, and the distance to the nearest developed land. | | X |
| 6. Does the proposed action include features not in accord with the Authority's Land Use Plan or land disposition policies?<br>If yes, specify the nature and extent of conflict. | | X |
| 7. Is the proposed action part of a series of similar or related actions that might generate cumulative impacts?<br>If yes, specify the type and extent of related actions, implemented or planned, and the general nature of potential cumulative impacts; indicate whether a generic or programmatic impact assessment has been or will be prepared for this series of actions. | | X |

**Notes (including sources of information):**

## E. Land Use

**E.1.** There are no standing structures in the vicinity of the proposed spur trail improvements; the spurs would traverse short lengths of natural wooded areas. These areas are not listed in the National Register of Historic Places[7] or the State Register of Historic Places database.[8] No buildings are located on site (the only structures are in association with the dam or causeway), and accordingly no listings were found on the Historic Buildings of Connecticut website.[9] In addition, according to the CT Trust for Historic Preservation, [10] the property is not located in a local historic district, and the RWA's Land Use Plan[11] does not list any historic sites.

**E.2.** The area is mainly forested, with some scenic water views of Lake Chamberlain. No impacts would occur to these features from the proposed activity.

**E.3.** The site is RWA property that allows passive recreation, fishing, and horse-back riding (all permissible with appropriate permits). Currently, the spur trails proposed for improvements are 'unofficial' and were created by visitors accessing the edge of the lake (presumably mainly for fishing). These areas are proposed to be marked and maintained similar to the existing trails on site. The proposed activity would improve the current recreational opportunities on site by providing safer access to the edge of the lake for fishing. In addition, the habitats surrounding the lake will be better protected by directing visitors to areas via marked paths, rather than allowing people to wander and potentially enter sensitive areas such as wetlands.

[7] https://npgallery.nps.gov/NRHP/SearchResults/, accessed January 19, 2021
[8] https://portal.ct.gov/DECD/Content/Historic-Preservation/03_Technical_Assistance_Research/Research/Historic-Property-Database, accessed January 19, 2021
[9] http://historicbuildingsct.com/category/towns/bethany/, accessed January 19, 2021
[10] http://lhdct.org/maps/state, accessed January 19, 2021
[11] Land Use Plan of the South Central Connecticut Regional Water Authority, Approved by the Representative Policy Board January 21, 2016

| F. Natural Resources and Other Economic Considerations | Yes | No |
|---|---|---|
| 1. Does the proposed action involve any irreversible commitment of natural resources? If yes, specify the type of resource, the importance and scarcity of the resource, the quantity that will be irreversibly committed, and any measure that could be included in the proposed action to reduce irreversible commitments of resources. | | X |
| 2. Will the proposed action significantly reduce the value and availability of timber or other existing economic resources? If yes, specify the type and extent of resources affected, the estimated revenue loss, and any measures that could be included in the proposed action to improve the efficiency of resource utilization. | | X |
| 3. Will the proposed action require expenditures greater than the projected revenues to the Authority? If yes, specify the estimated difference. | | X* |
| 4. Will the proposed action require any public expenditure (e.g., provision of municipal services) that might exceed the public revenue it is expected to produce? If yes, specify the estimated difference. | | X |
| 5. Will the proposed action cause a decrease in the value of any surrounding real estate? If yes, estimate the amount and distribution of altered real estate values. | | X |

**Notes (including sources of information):**

**F. Natural Resources and Other Economic Considerations**

**F.3.** The spur trail improvements will be implemented and maintained by RWA personnel, so no additional costs would be incurred. No extra revenue is expected.

| G. Public Safety and Health | Yes | No |
|---|---|---|
| 1. Is the site subject to unusual fire hazard (from flammable vegetation, difficulty of access, lack of water for fire fighting, or other causes)? If yes, specify the type of hazard, the extent to which the proposed action might increase the fire hazard, the extent to which it is subject to damage from such fires, and any measures included in the proposed action to reduce the risk of fire damage. | | X |
| 2. Does the site include any features that present potential safety hazards under the proposed conditions of use, or will the proposed action create any hazards to public safety? If yes, specify the hazards, the extent to which the public, workers, or others will be exposed to the hazard, the degree of risk, and any measures that will be included in the proposed action to eliminate hazards or reduce the risk of injury. | | X* |
| 3. Does the proposed action have the potential to create increased risks to public health? If yes, specify the nature of the health hazards, population at risk, the degree of risk, and any measures that will be incorporated in the proposed action to avoid adverse impacts on public health. | | X |

**Notes (including sources of information):**

## G. Public Safety and Health

**G.2.** The proposed spur trail improvements support lake access and fishing at the reservoir. These activities, which are currently permitted and occurring at Lake Chamberlain, are potentially hazardous, as they involve access to open water. No increase in safety hazards would occur due to the proposed activity.

| H. Community Factors | Yes | No |
|---|---|---|
| 1. Does the proposed action include any features that are not in conformity with local, regional, or state plans of conservation and development? If yes, specify the plan(s), the nonconforming features, and the extent of the nonconformity, and any measures that could be incorporated into the proposed action to improve conformity. | | X* |
| 2. Does the proposed action differ from the established character of land use in the surrounding area? If yes, specify the nature and extent of the conflict and any actions that might be taken to resolve it. | | X |
| 3. Will the proposed action require any service by public facilities (streets, highways, schools, police, fire) or public utilities that are expected to exceed capacity within 5 years? If yes, specify the type of facility or utility, its capacity, present and projected use, the additional capacity required to implement the proposed action, any public plans to increase the capacity, and any measures that can be incorporated into the proposed action to reduce excessive demands on public facilities. | | X |
| 4. Will the proposed action produce any substantial increase in nonresident traffic to the area (construction or other temporary workers, permanent workers, recreational users, etc.)? If yes, specify the amount and type of traffic, its potential impact on the surrounding neighborhood, and any measures included in the proposed action to reduce adverse effects from increased traffic. | | X |
| 5. Will the proposed action produce an increase in projected growth rates for the area? If yes, specify the extent to which growth will be increased, the project ability of the community to cope with higher growth rates, and any measures include in the proposed action to reduce anticipated adverse effects from increased growth. | | X |
| 6. Is there any indication that the proposed action can be expected to generate public opposition or conflict over environmental concerns? If yes, indicate the type and source of conflict, whether it is limited to immediate neighbors of the site or extends to the larger community, and any measures that have been taken or could be taken to resolve the conflict. | | X |

**Notes (including sources of information):**

## H. Community Factors

**H.1.** State, regional, and local conservation and development plans have similar principles with regard to open space and recreational activities. The proposed spur trail improvements do not contradict these principles, and may even benefit their causes by enhancing the accessibility of the property for recreational activities such as fishing. The principles supporting, or not contradicting, the spur trail improvements are discussed below for the Conservation and Development Policies Plan for Connecticut, 2013-2018[12] (CT C&D Plan), the South Central Region: Plan of Conservation and Development 2018-2028 (Regional POCD),[13] and the Bethany 2010 Plan of Conservation and Development (Bethany POCD).[14] Note that the CT C&D Plan, although dated ending in 2018, is current. A Revised Draft 2018-2023 State C&D Plan is under consideration by the General Assembly in the 2021 legislative session.[15]

The CT C&D Plan Growth Management Principle #4 (Conserve and Restore the Natural Environment, Cultural and Historical Resources, and Traditional Rural Lands), State Agency Policy 4.13 is: "Manage water resource conflicts by balancing the competing needs of water for human consumption, waste assimilation, habitat sustainability, recreation, power production, agriculture and transporting people and goods…" Improvement of the spur trails will support this policy by balancing recreation (fishing) with water supply and habitat sustainability. The paths chosen for improvement would avoid areas of sensitive habitat.

In the Regional POCD, a goal/strategy within the Natural Environment chapter is to "Encourage resident access to open spaces and recreational assets within the region through the expansion of existing bike/pedestrian network connecting open spaces and other existing/proposed regional trail connections." The proposed activity would improve and expand access to fishing at the lake, which is substantially in agreement with the Regional POCD goal.

The Bethany POCD, within the Open Space Policies and Measure discussion, states that "water quality shall be protected by preserving watersheds," and the Town should "work collaboratively with the Regional Water Authority." The Bethany POCD does not make specific recommendations or suggestions for the Lake Chamberlain property, as it is RWA property and not considered available to the public (a RWA recreation permit is required to use the property). However, the proposed project does not contradict the policies of the Bethany POCD.

[12] https://portal.ct.gov/OPM/IGPP-MAIN/Responsible-Growth/Conservation-and-Development-Policies-Plan/2018-2023-POCD-Update

[13] https://scrcog.org/wp-content/uploads/2018/07/2018-07-SCRCOG-POCD-report-online.pdf

[14] https://bethany-ct.com/download/conservation_commission/2010-Plan-of-Conservation-and-Development-see-pg-48-for-Open-Space-Plan.pdf

[15] https://portal.ct.gov/OPM/IGPP-MAIN/Responsible-Growth/Conservation-and-Development-Policies-Plan/Conservation-and-Development-Policies-Plan (also see reference 9, above)

# ATTACHMENTS

**DEEP letter (NDDB Determination Number: 202100560)**

**CTECO Maps:** ***Natural Diversity Database***

***Erosion Susceptibility***

***Inland Wetland Soils***

***Farmland Soils***

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

January 27, 2021

Eva Szigeti
Evans Associates Environmental Consulting, INC
162 Falls Rd
Bethany, CT 06524
eva@eaec-inc.com

**NDDB DETERMINATION NUMBER:** 202100560

**Project:** Installation of permanent trails for previously used unofficial pathways to lake; LAKE CHAMBERLAIN FISHING TRAILS, 48 OLD MILL RD (WEST OF SPERRY RD), BETHANY, CT

**Expiration**: January 27, 2022

I have reviewed Natural Diversity Database (NDDB) maps and files regarding this project. According to our records, there are State-listed species (RCSA Sec. 26-306) that may be influenced by activities within the proposed project area.

- **Eastern box turtle (*Terrapene carolina carolina*)- State Special Concern**

In Connecticut, these turtles are found in well-drained forest bottomlands and a matrix of open deciduous forests, early successional habitat, fields, gravel pits, and or powerlines. Turtles are dormant between November 1 and April 1 and hibernate in only a few inches from the surface in forested habitat.

The greatest threat to this species is habitat loss, fragmentation, and degradation due to development. This species is very sensitive to adult mortality because of late maturity (10 years old) and long life span (50-100years). Vehicular traffic, heavy equipment used for farming, and ATV use in natural areas are implicated specifically in adult mortality through collisions. Illegal collection by the pet trade and unknowing public for home pets exacerbates mortality rates and removes important individuals from the population. Predation rates are also unnaturally high because of increased predator populations (e.g. skunks, foxes, raccoons, and crows) that surround developed areas.

Recreational activities can increase incidental collection, may negatively impact nesting behavior, and can contribute to local turtle population decline. Most often turtles collected are adult females traveling to and from nesting. These turtles of reproductive age are the most valuable individuals in the population to maintain population persistence. Due to slow maturity and low reproductive success, even infrequent collection poses a long-term conservation problem.

- To avoid collection by the public, do not post signs alerting the public to the presence of this species.
- Litter from recreation can pose a choking hazard. Ensure there is a plan for how garbage will be managed.
- **I recommend you consult with biologists to plan your recreational trail paths so they minimizes the effect on this species.**

- It is very important to route recreational trails away from nesting areas.

Your project is located in a large block of suitable habitat for this species, as a land manager, you can benefit this species through landscape planning beyond your project area.

- Landscape Planning: Use partnerships and landscape scale planning to protect important conservation areas for this species

This is determination is valid for two years. Please submit an updated NDDB Request for Review if the scope of the proposed work changes or if work has not begun by expiration date.

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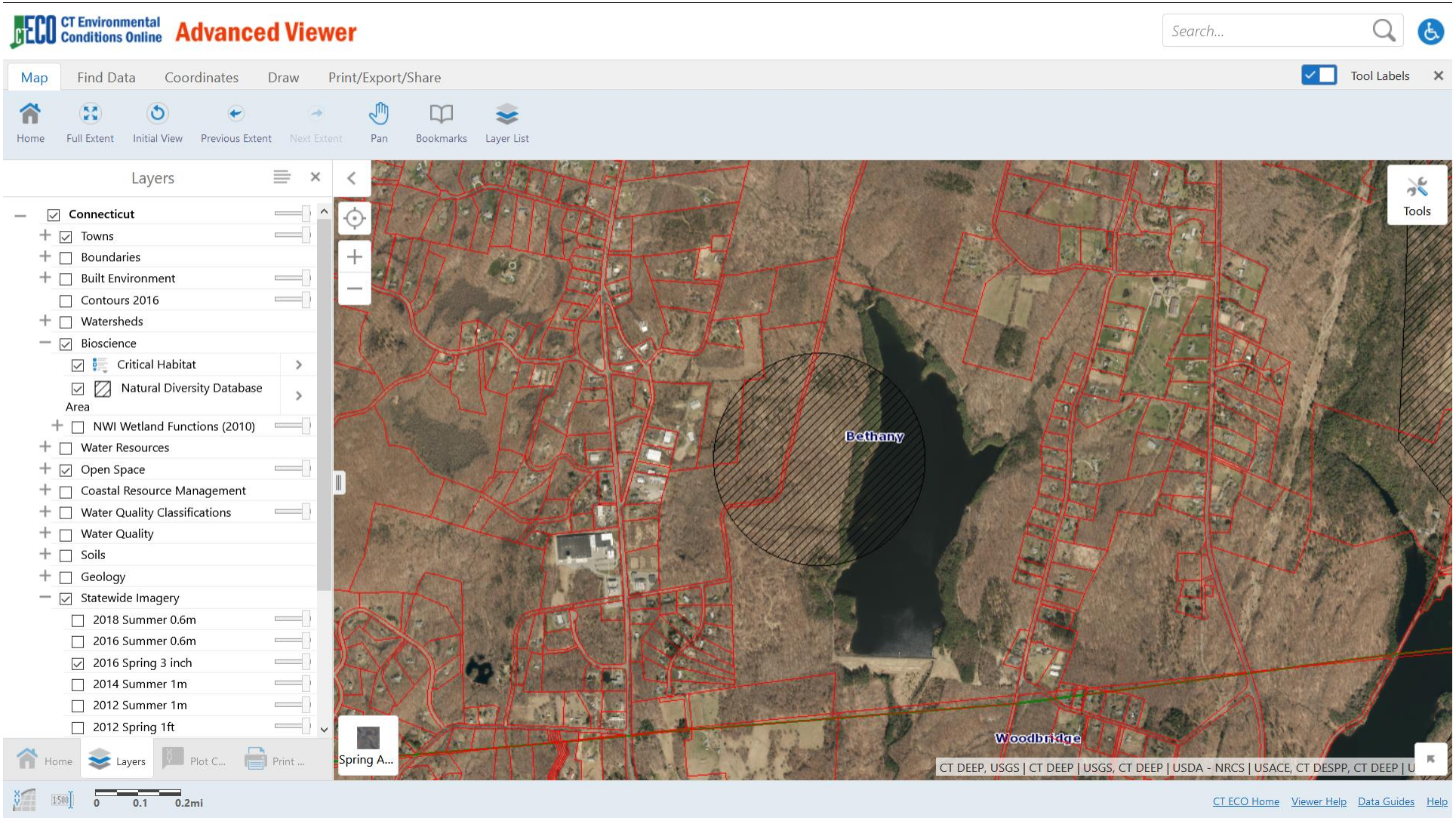
Natural Diversity Database information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Bureau of Natural Resources and cooperating units of DEEP, independent conservation groups, and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the NDDB should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated in the NDDB as it becomes available.

Please contact me if you have any questions (shannon.kearney@ct.gov). Thank you for consulting with the Natural Diversity Database and continuing to work with us to protect State-listed species.

Sincerely,

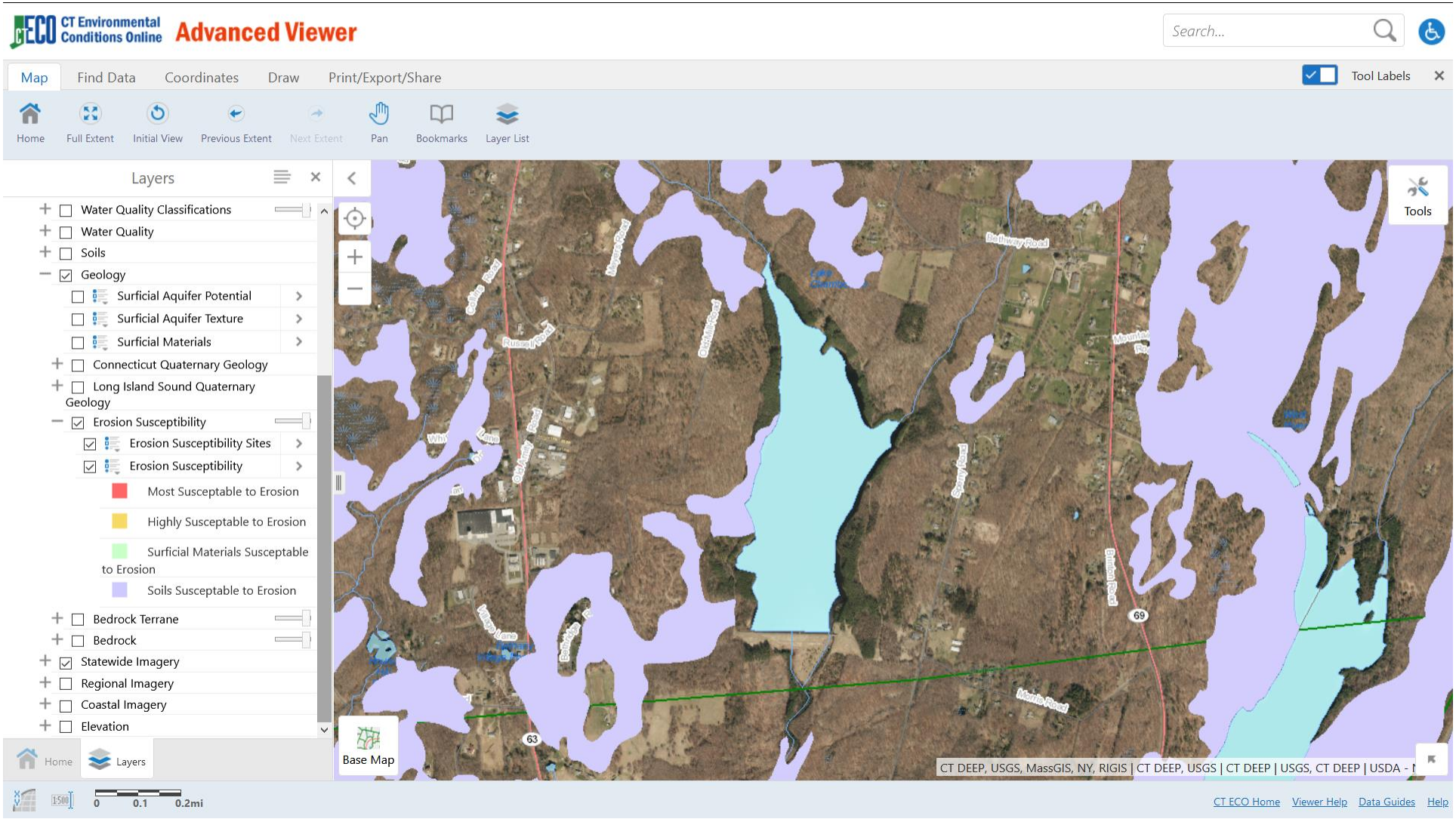
/s/ Shannon B. Kearney
Wildlife Biologist

## Natural Diversity Database

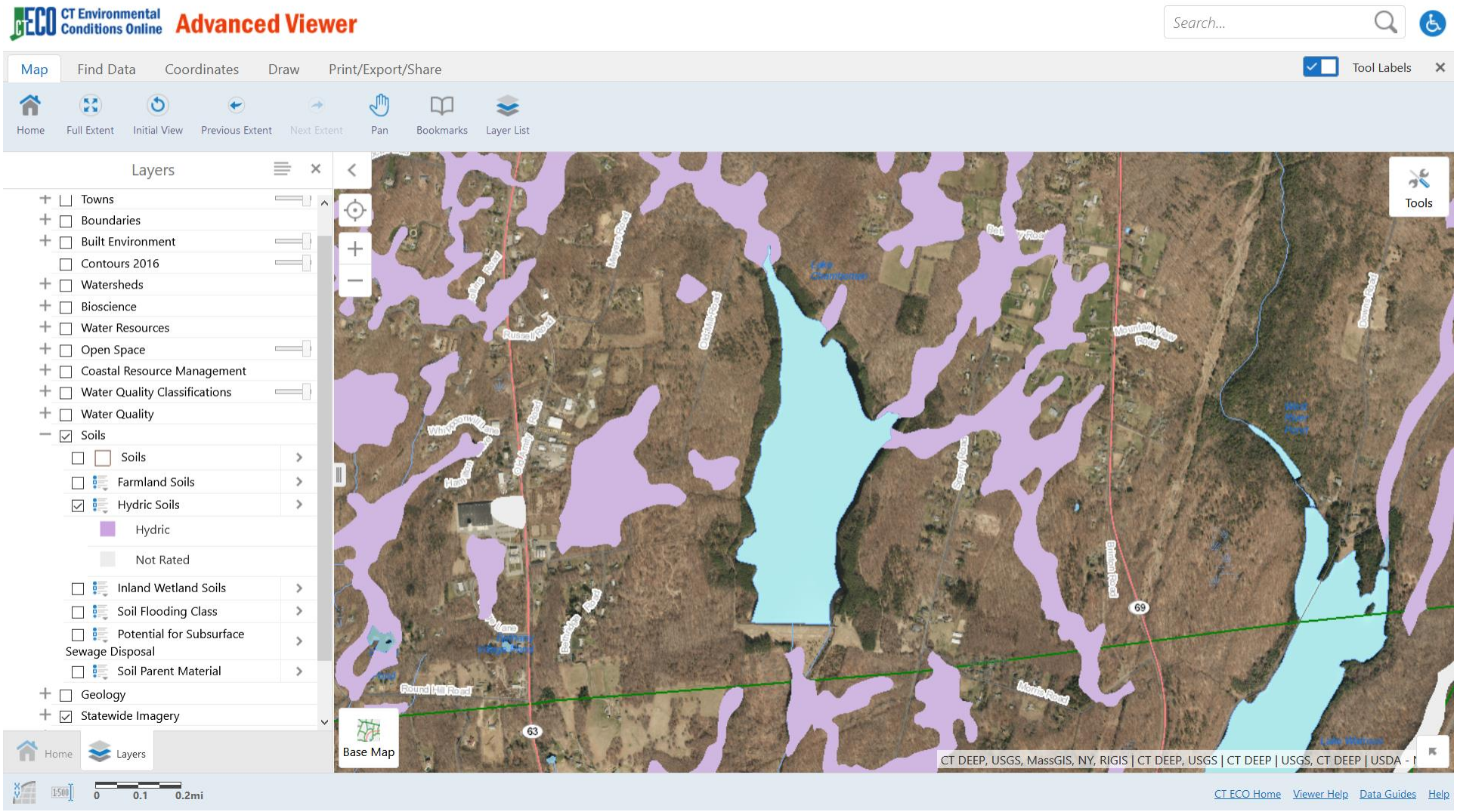



Hatch represents represent approximate location of endangered, threatened, or special concern species and/or significant natural communities.

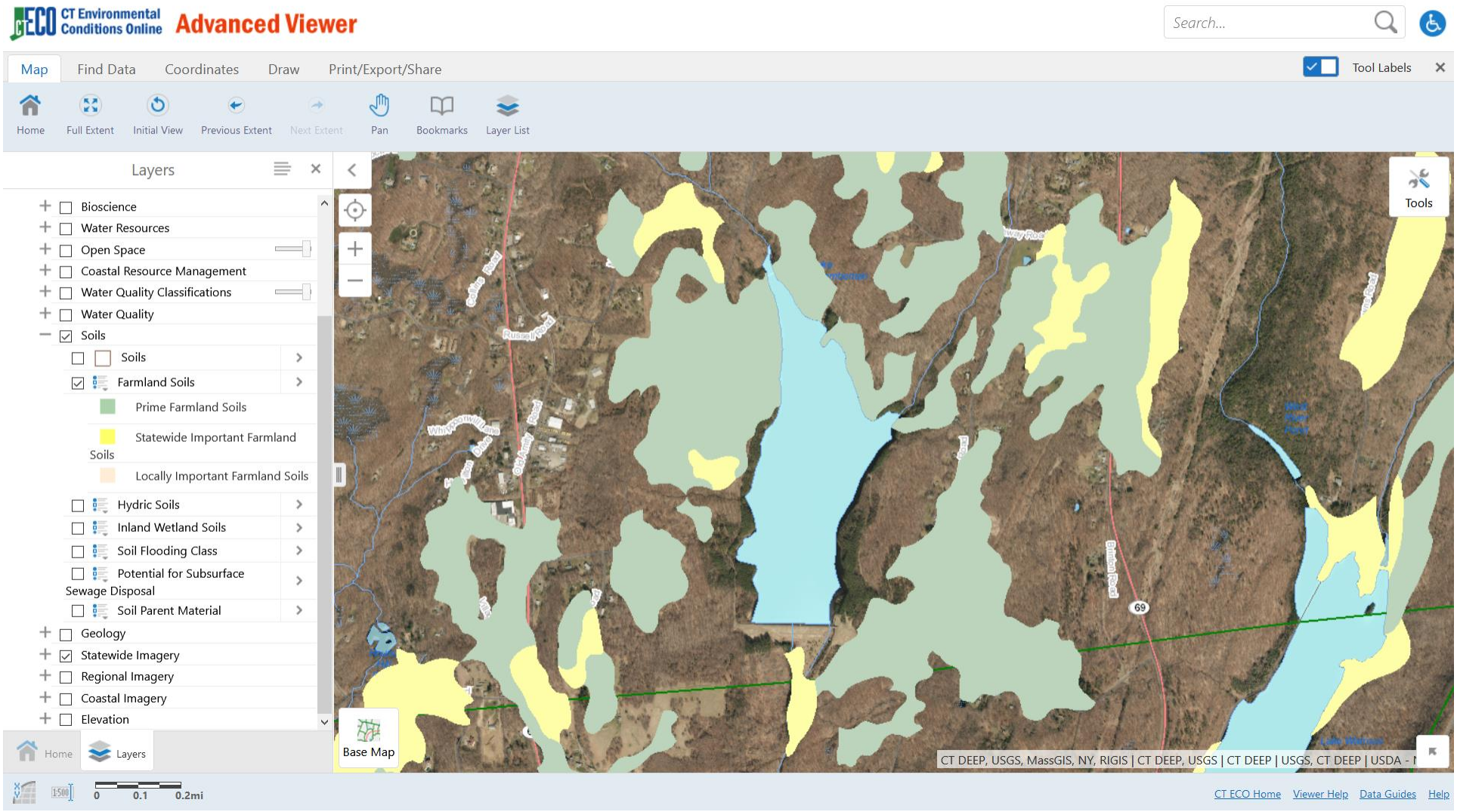
# Erosion Susceptibility



# Inland Wetland Soils



# Farmland Soils



**June 9, 2021**
**Land Use Committee Meeting**

Reservoir Levels (Percent Full)

| | Current Year | Previous Year | Historical Average | Drought Status |
|---|---|---|---|---|
| May 31, 2021 | 97% | 96% | 93% | None |

Rainfall (inches)

| | Current Year | Previous Year | Historical Average |
|---|---|---|---|
| May 2021 | 5.08 | 1.73 | 3.93 |
| Fiscal YTD (6/1/20 – 5/31/21) | 42.26 | 47.74 | 46.56 |

Land We Need for the Water We Use Program (Dispositions/Acquisitions)

- Durham - Corresponded with property owner of 16+/- acres.
- Killingworth – Corresponded with a property owner of 4+/- acres.

Hamden, Olin property option – Executed transfer of the option, but will have to re-execute in order to file it on the land records. Attended online meeting about the property with various stakeholders.

Guilford and Madison (GU 21 and MA 2A) – Continued discussion of Class III land with member of the Guilford Sportsman Association.

Rental houses:

- Hamden, 95 Ives St. (HA 13) – Notices for the public hearing were published.
- Woodbridge, 2040 Litchfield Tpk. – Juliano found pins and staked midpoints, including one that was about 5' within the garden. Issued letter about the lines. Met with contractor to get quote on fences.

Forestry Update

- Guilford – West of Sugar Loaf ash salvage (GU 4) – 40% complete
- Killingworth - East Hammonasset Leaf Screen Thinning, (KI 4) - Contract not yet awarded.
- Hamden - Overstory removal and Tornado Salvage, (HA 36) – Not started yet.
- Madison - Nathan's Pond Slash Wall Harvest (MA 6) – **15% complete.**
- Seymour - Silvermine Road Slash Wall Harvest (SE 9) – Awarded contract. Not started yet.

  - Planted pitch pines at Maltby.
  - Marked 400+ cords of firewood.
  - Performed a drone flight over timber harvest by Nathans Pond.

Recreation

- DEEP stocked catfish at the Maltby Lakes.
- Discussed impact of trout season changes by DEEP with them.
- Archery class held for kids had 12 participants.
- Issued letter to CFPA approving a de minimis relocation of the Quinnipiac Trail relocation in Hamden and Bethany.
- Issued letter to CFPA approving a de minimis relocation of the Mattabesset Trail relocation in Madison.
- FMA approved the LUP amendment for fishing trails at Lake Chamberlain and forwarded to the RPB.
- Hazardous trees removed at Lake Chamberlain.

- Gave tour of three recreation areas to two Customer Service staff.
- Walked more of the proposed mountain bike trails at Genesee with NEMBA representatives.
- Received updated request for disc golf properties in North Branford (NB 14 and NB 14A). Responded that we would not be interested in the proposal at that location.

| | May | | April | |
|---|---|---|---|---|
| | 2021 | 2020 | 2021 | 2020 |
| Permit Holders | 6,337 | 5,160 | 6,502 | 4,479 |

Special Activity Permits

- Connecticut Agricultural Experiment Station, (Gerda Magana and Sara Carson) - Placing and servicing of invasive insect traps and doing visual inspections for invasive insects. Looking for Velvet longhorned beetle, Oak ambrosia beetle, Oak processionary moth, Asian longhorned beetle and spotted lanternfly, Lake Saltonstall, (05/19/21 – 10/31/21)
- North Madison Vol. Fire Co. (Bob Blundon) – map roads and trails for fire rescue and fire fighting property in North Madison; (5/19/2021 – 12/31/2021) Mr. Bob Blundon
- RWA and St. Bridget School (Jeffrey Yale) – offering families of St. Bridget School in Cheshire, to bring children to Lake Camberlain Recreation Area to hike and fish; 5/22/21
- Milford Police Department (Lieutenant Luke Holder and designees) – Police dive training, Maltby Lakes, (5/24/21)
- USDA Forest Service (Dr. Melody Keena) – Collect tree branches off large or small trees for research on Asian gypsy moth or spotted lantern fly; West River Watershed, Peat Swamp reservoir area, Lake Gaillard areas, Mill River; (5/20/2021-5/20/2022)
- CTDEEP (Dr. Min Huang) – mallard nesting study; Maltby Lakes (5/20/21-6/30/21)
- State of CT Cross Connection Committee (Adam Pandolfi) – State of Connecticut Cross Connection Committee Meeting; Lake Gaillard; (06/16/2021)

Other items

- Encroachments/agreements –
    - Agricultural fields – Corresponded with four perspective farmers about using Authority property. Discussed use of herbicides at the Sol's Path field (NB 4) with Miscio.
    - Branford, Hilltop Dr. (BR 6) – Met with Land Trust staff to look over gate that was installed and gave them signs to use at the proposed gate at Hilltop Dr.
    - Seymour, ginseng request (SE 3) – Signed license agreement with Duclos to grow ginseng.
    - Madison, Dead Hill Rd. (MA 4) – Sent letter to Philbrick and Weinstein about the trees cut over the property line. Firewood will be paid for by Hopkins on his permit.
    - East Haven, 167 Saltonstall Parkway (Route 1) (EH 7) – Encroachment originally noticed by the town engineer and confirmed later by our staff. Contacted the abutter at 161 Saltonstall Parkway and issued cease and desist letter. Operations staff has been working on stabilizing and restoring the site. Contacted Juliano to reset the boundary corners once work is complete to install fence.

- Invasive plants – Treated or documented invasive plant populations in Guilford, Bethany, North Branford, Madison, and Branford. Held walk at Sugarloaf for CIPWG with eight participants. Met with researchers at Gaillard for sites with mugwort and goldenrod growing together for a predator-prey study. Installed insect traps with researcher to monitor potentially invasive insects (velvet longhorn beetle, oak ambrosia beetle, oak processionary moth). Met with UI staff to discuss herbicide use at Lake Saltonstall.

| | |
|---|---|
| Invasive Species Documented/ Mapped (ac) | 9.5 acres |

| | |
|---|---|
| Invasive Species Treated (ac/MH) | 1.75 acres |

- East Haven, Virginia Rd. (EH 3) – Juliano found boundaries and pins for us to remark the boundary lines. Issued map with what they found.
- North Branford/Guilford, Reeds Gap Rd. – The Guilford assessor's office corrected the matter and transferred the property card to landowner's name.
- New Haven, East Rock Park access to Lake Whitney dam – Collected GPS data for CP&D on the proposed easement route.
- Comcast lease, Burwell Tank site – Finalized the changes to the 2nd amendment. Forwarded to Comcast. Signed our copy of the agreement.
- Bethany, Simon Dam – Corresponded with the dam contractor for the Simon's and noted that we would not alter operations to meet their needs in the spring, but would be willing to make changes in the late summer or fall.
- Deer hunt – Applications have been received throughout the month. Deadline for applications is June 18.
- Bethany, Bear Hill Rd. – Corresponded with Bethany RPB representative about an old discussion among the Bethany selectmen to discontinue the road. Explained the situation and noted that it is open to the public, but there is no ability for people to travel it legally since there is no bridge over the impoundment.

Attachments

- May 15, 2021 - RWA Supports Environmental Initiatives Through Claire C. Bennitt Watershed Fund - RWA press release
- May 18, 2021 - New Haven environmental programs get boost through Watershed Fund grants – NH Register
- June 1, 2021 - Rodent poison killing birds of prey in CT, wildlife experts say – NH Register
- June 6, 2021 - Hoover Dam, a symbol of the modern West, faces an epic water shortage – USA Today

Upcoming Agenda Items

July 2021 –

**RWA Supports Environmental Initiatives Through Claire C. Bennitt Watershed Fund**

Watershed Fund awards grants to the New Haven Ecology Project and New Haven Urban Resources Initiative

The Regional Water Authority (RWA) announced today that the company's Claire C. Bennitt Watershed Fund has awarded grants in support of environmental and educational initiatives to the New Haven Ecology Project and New Haven Urban Resources Initiative.

"These initiatives are strongly aligned with the Claire C. Bennitt Watershed Fund's mission to protect water quality throughout the region," said Brian M. Stone, Claire C. Bennitt Watershed Fund President. "We hope to strengthen community involvement by supporting these efforts to promote the importance of environmental awareness and protection of our water supply."

"High-quality drinking water is a precious natural resource, and providing that resource starts with source protection," said Larry Bingaman, President and CEO of the RWA. "Through environmental education programs, we can inspire young minds, compel them to action and work together to protect these resources for generations to come."

The Watershed Fund awarded a $10,000 grant to the New Haven Ecology Project's Schoolyards Program. The money will support the creation, effective use and maintenance of Common Ground High School gardens, habitats and outdoor classrooms for the next generation of environmental leaders.

Another $10,000 grant was awarded to the New Haven Urban Resources Initiative to support its GreenSkills Tree Planting and Outreach program. This program allows New Haven residents to request a free tree to be planted on their property. Trees improve water quality by serving as natural filters, protecting streams, reservoirs and other waterways.

The RWA created The Watershed Fund in 1999, and remains a driving force behind its mission to protect water quality by acquiring watershed land and promoting environmental education. Working in partnership with municipalities, land trusts and other entities, The Watershed Fund enhances the environment and improves quality of life by protecting drinking water supplies and threatened watershed lands. The education programs and scholarships supported by The Watershed Fund provide future leaders with the tools they need to preserve and protect open space and drinking water supply resources.

**New Haven environmental programs get boost through Watershed Fund grants**

NH Register - By Business Staff

May 18, 2021

A $10,000 award to New Haven Urban Resources Initiative will help support its GreenSkills Tree Planting and Outreach program, through which city residents can request that a tree be planted, for free, on their property.

NEW HAVEN — Two local environmental initiatives will receive a boost through recent grant awards.

The Regional Water Authority's Claire C. Bennitt Watershed Fund has awarded $10,000 each to the New Haven Ecology Project and New Haven Urban Resources Initiative, according to a release.

The funding for New Haven Ecology Project's Schoolyards Program will support the "creation, effective use and maintenance" of gardens, habitats and outdoor classrooms at Common Ground High School, while the award to New Haven Urban Resources Initiative will help support its GreenSkills Tree Planting and Outreach program, the release said. Through the program, city residents can request that a tree be planted, for free, on their property.

"These initiatives are strongly aligned with the Claire C. Bennitt Watershed Fund's mission to protect water quality throughout the region," Brian M. Stone, Claire C. Bennitt Watershed Fund president, said in the release. "We hope to strengthen community involvement by supporting these efforts to promote the importance of environmental awareness and protection of our water supply."

The funding aims to protect and grow natural resources, the release said.

"High-quality drinking water is a precious natural resource, and providing that resource starts with source protection," Larry Bingaman, president and CEO of the RWA, said in the release. "Through environmental education programs, we can inspire young minds, compel them to action and work together to protect these resources for generations to come."

**Rodent poison killing birds of prey in CT, wildlife experts say**

NH Register - Josh LaBella - June 1, 2021

KILLINGWORTH — In 2019, a baby great horned owl living at A Place Called Hope was found dead.

The cause? Rodenticides.

“We felt responsible,” Christine Cummings said. “We felt like we missed something. We have to take this baby and we have to send it in for a necropsy.”

Cummings, president of the wildlife rehabilitation center that caters to birds of prey, said the 5-week-old bird looked and appeared healthy, and its parents were not very far away when it died.

“The results came in,” she said. “The bird had died from toxins in the body — from rodenticides.”

The rodenticides, which people use to kill mice, rats and other varmints, were anticoagulants. They work by thinning the blood and causing the animal to slowly bleed to death.

Cummings and other wildlife rehabilitationists and preservationists are pushing for the state to ban the poisons, which she said is having an impact up and down the food chain. She recently started a petition to raise awareness about the issue.

“Humans today, we’re all very fast-paced and multitasking,” she said. “I think that we are so used to immediate, instant gratification and instant results. I think that just grabbing poisons and big boxes of chemicals is a sure way to eradicate whatever it is that’s bothering you — whatever it is you don’t want on your property — without thinking about the aftermath of that.”

**The impact of rodenticides**

Cummings said she has seen more birds poisoned by rodenticides each year for at least a decade.

In 2018, Cummings said, A Place Called Hope was called about a dead mother owl that left behind two babies. They tested the mother and she had lethal levels of rodenticide in her system.

“We couldn’t find the other adult, and the babies were up in the nest, and we had to go up and retrieve them,” she said. “One of the babies also succumbed to it, but did not die. We were able to flush its system and bring it back around. Both those babies did survive, but they had been fed poison.”

More recently, Cummings said a baby raven was rescued that has a crossed beak, is blind in one eye and can barely see out of another. She said these birth defects come from the toxins its parents were consuming.

“It’s always been there,” she said. “Since we started in 2005 as rehabilitators, and watching other centers, we’ve always been aware of what we call the secondary, non-targeted victims to rodenticide poisoning.”

A 2020 study by Tufts Wildlife Clinic found that all 43 red-tailed hawks tested in Massachusetts were found to have the anti-coagulant rodenticide in their system, with 91 percent of them testing positive for more than one.

The study’s author, Maureen Murray, noted 97 percent of hawks examined tested positive in her 2017 paper.

A study published this year by the University of Georgia found that 83 percent of bald eagles and 77 percent of golden eagles tested positive for these everyday mouse and rat poisons.

Cummings said rodents poisoned by the substance become easy targets for birds of prey and other animals that hunt them.

Laura Simon, president of the Connecticut Wildlife Rehabilitators Association and a wildlife ecologist, specializes in helping people solve urban wildlife problems.

“Rodenticides are a big part of the calls I get and the situations we handle,” she said. “The problem is, people do not realize the impact of these insecticides and rodenticides, and put them out in all the wrong ways.”

Simon said her wildlife rehabilitators often receive calls about birds of prey and other wildlife — including other birds, coyotes, fox and raccoons — getting second-hand poisoned.

“People want these animals saved,” she said. “I work with a network of wildlife rehabilitators and it’s impossible most of the time. It’s devastating to watch these hawks, owls, raccoons, songbirds all succumb to these rodenticides.”

Cummings said she’s grown frustrated because she’s unable to save the birds and the issue persists.

“It feels like it’s a losing battle all the time, because I’m looking directly into the eyes of a bird that is suffering from secondary poisoning and there’s not much I can do,” she said. “Usually, by the time I get them, it’s too late.

**Pushing for change**

A petition created by Cummings in support of banning the toxins has drawn nearly 4,000 signatures.

“We always say, ‘Well, go to your legislator,’” she said. “I finally said, if I want something done, I have to do it myself.”

Cummings and Simon said they are pushing to make people more aware of the problems caused by rodenticides. Cummings said states such as California have banned the use of some of these poisons, and she wants Connecticut to do the same.

“It’s going to, in the long run, make a huge difference for the environment and for our wildlife,” she said. “If we got people to understand that it’s not simply the rat or the mouse that they’re targeting.”

Simon said the rodent problem is really a people problem, adding that humans leaving out food attracts mice and rats to their property.

“The best way to solve these rodent problems is to get rid of the food source,” she said. “Contain the food. That’s where the answer lies. It’s not trying to poison every animal that comes for the feast.”

Cummings suggested using live-traps to catch and remove rodents without killing them, as well as other alternatives to poisons.

“My second favorite one is putting up nesting boxes for owls,” she said. “Encourage owls to come to your property. It doesn’t always work but it certainly helps.”

Cummings, Simon and others involved in animal protection, research and conservation, plan to meet this month to discuss raising the issue for the next legislative session.

“To turn it into a proper bill to have these rodenticides removed,” she said. “We do have plans to get organized, and that’s where the signatures are important.”

Cummings said she and her colleagues are also trying to get other wildlife rehibilitators to log all the cases they are seeing or treating for proven or suspected rodenticide poisoning. She said they want to use that information to show lawmakers the extent of the problem.

Simon said education is a big part of their goals, noting that people do not always see the end result of using the poisons.

“They don’t always see the dying animals. We get calls about them, and we see them,” she said. “We have to handle them and we watch them die horrible deaths. But because the public doesn’t have direct awareness about this issue, it’s hard to rally them into supporting these bills, calling their legislators and putting enough pressure on them.

**Hoover Dam, a symbol of the modern West, faces an epic water shortage**

The effects of drought and climate change are seen at Hoover Dam, which will soon hold the smallest amount of water since it was filled in the 1930s.

Ian James, Arizona Republic/USA Today Jun. 6, 2021

BOULDER CITY, Nevada — Hoover Dam towers more than 700 feet above Black Canyon on the Arizona-Nevada state line, holding back the waters of the Colorado River. On top of the dam, where visitors peer down the graceful white arc of its face, one of its art deco-style towers is adorned with a work of art that memorializes the purposes of the dam.

In five relief sculptures by Oskar Hansen, muscular men are shown gripping a boat's wheel, harvesting an armful of wheat, standing beside cascading water and lifting a heavy weight overhead. With the concrete figures are words that encapsulate why the dam was built, as laid out in a 1928 law: FLOOD CONTROL, NAVIGATION, IRRIGATION, WATER STORAGE and POWER.

Eighty-six years after its completion in 1935, the infrastructure at Hoover Dam continues doing what it was designed to do: holding water and sending it coursing through intake tunnels, spinning turbines and generating electricity. But the rules for managing the river and dividing up its water — which were laid down nearly a century ago starting with the 1922 Colorado River Compact and which have repeatedly been tweaked — are now facing the greatest strains since the dam was built.

The effects of years of severe drought and temperatures pushed higher by climate change are strikingly visible along Lake Mead's retreating shorelines near Las Vegas, where the growing "bathtub ring" of whitish minerals coats the rocky desert slopes.

Since 2000, the water level in Lake Mead, which is the reservoir formed by Hoover Dam and holds the title of the largest reservoir in the country, has dropped about 140 feet. It is now just 37% full, headed for a first-ever official shortage and sinking toward its lowest levels since it was filled.

One of the West's driest 22-year periods in centuries is colliding with the river's chronic overuse. As the reservoir falls toward record lows, its decline threatens the water supplies of cities and farmlands, and reveals how the system of managing water in the desert Southwest faces growing risks.

**Water levels expected to fall below federal threshold this summer**

Mike Bernardo of the federal Bureau of Reclamation leads a team of engineers and hydrologists who plan water releases from Hoover Dam, as well as Davis and Parker dams downstream, sending flows that travel through pipelines and canals to Phoenix, Los Angeles and farmlands in the U.S. and Mexico that produce crops such as hay, cotton, grapes and lettuce.

Bernardo's team also sets power generation goals and produces a monthly report with the latest projections of how reservoir levels will likely change over the next 24 months. Lately, each month's report has brought worsening numbers.

Predicted water-level declines have grown as estimates of inflows into Lake Powell, the upstream reservoir, have shrunk due to extremely parched conditions across the upper watershed in the Rocky Mountains, where much of the river's flow originates as melting snow. "Unfortunately, due to how dry things have been," Bernardo says, "what we're seeing is Lake Powell's elevations are dropping."

And that will mean less water flowing into Lake Mead for the rest of the year. The past 12 months have been among the driest on record across the Colorado River Basin. Inflows into Lake Powell from April through July are estimated to be just 26% of the long-term average, and that's leading to rapid declines in both Powell and Mead, the two largest pieces of the river's water-storage system.

The warm, dry conditions over the past two years have baked the watershed's soils to such an extent, Bernardo says, that "when the snowmelt starts to run off, it just gets sucked up into the ground like a sponge."

But the demands for water downstream from Hoover Dam continue. And with the Southwest's farmlands in peak irrigation season through June, Bernardo says, Lake Mead's surface is dropping about 1 foot each week. The reservoir has declined more than 16 feet over the past year and is forecast to fall about 9 feet more by the end of this year.

The latest projections show that by the end of 2021, Lake Mead will decline below an elevation of 1,066 feet, far below the threshold — 1,075 feet — for the federal government to declare a shortage. That's expected to happen in August, triggering the largest water cuts to date next year for Arizona, Nevada and Mexico.

Even larger cutbacks could come in 2023 if the reservoir continues to decline as projected over the next year into a more severe "Tier 2" shortage. Lake Mead's downward spiral is being driven largely by the dire situation upstream at Lake Powell, which has declined to 34% of full capacity. "We need three to four consecutive years of above-average inflow, snowpack runoff and inflow into Lake Powell, to refill these reservoirs," Bernardo says. "So that's what we're hoping for."

The Colorado River naturally cycles through wet and dry periods. But over the past 22 years, the watershed has had 17 dry years, Bernardo says, and only 5 years with above-average or wet conditions.

With climate change, hotter temperatures have been evaporating more moisture off the landscape and leaving less flowing in the river and its tributaries. Scientists describe it as a “megadrought” and one that, unlike the long droughts of the past, is being amplified by carbon pollution and the heating of the planet.

One of the unknowns facing the officials who manage Colorado River water is just how severely the reservoirs could be affected by climate-driven “aridification” in the years to come. But some scientists have estimated the river could lose roughly one-fourth of its flow by 2050 as temperatures continue to rise, and that for each additional 1 degree C (1.8 degrees F) of warming, the average flow is likely to drop by about 9%.

“With the warmer temperatures,” Bernardo says, “not only do we see things melt off quicker but you have that rising snow line, which creates less inflow.”

In 2019, representatives of Arizona, Nevada and California agreed under a deal called the Drought Contingency Plan to share in water reductions through 2026 to reduce the risks of Lake Mead falling to critically low levels. The agreement calls for progressively larger cutbacks if Lake Mead continues to drop below lower trigger points in the coming years.

If the reservoir drops below 1,045 feet, California would start to take cuts. And Mexico is already contributing by leaving some water in Lake Mead. “These mechanisms have been put into place to protect these reservoir elevations,” Bernardo says.

While the latest agreement is intended as a temporary stopgap measure, officials from the seven states that depend on the river are preparing to negotiate new rules for managing shortages after 2026. And those talks promise to be tougher.

In the meantime, Bernardo says, the bureau's responsibilities in managing the dams and water deliveries remain the same. And that includes incorporating the latest science and models, and providing up-to-date information to representatives of the states, water districts, tribes and other entities along the river, Bernardo says, “to communicate what's going on and what we're seeing, so everyone can act proactively.”

“When you have a river system like this, a complex reservoir and river system especially, that is experiencing the hydrology that we've been seeing, and such a quick decline in the Upper Basin over these last two years, transparency and communication is key,” Bernardo says.

**Iconic dam holds less and less**

Bernardo is 35 and has worked for the Bureau of Reclamation for nearly a decade, including the last two years as river operations manager. A mechanical engineer who grew up in New Jersey, he usually works with his staff at the agency’s office in Boulder City, Nevada, but he also regularly drives out to visit the dam, sometimes to lead special tours.

Whenever he rounds the curve in the canyon and sees the dam, Bernardo says, he feels awestruck and “the hair still sticks up on my arms.” “It never gets old,” he says. “I’m wowed by the engineering marvel.”

Part of that comes from knowing the history of all that went into the dam’s design and construction during the Great Depression, from the hand-drawn blueprints to the blasting with dynamite, the railroad that carried supplies, and the massive amounts of concrete that were poured in, creating a dam that is 660 feet thick at its base — nearly as thick between the reservoir and the downstream side as it is tall. (According to the Bureau of Reclamation, Hoover Dam contains enough concrete to build a sidewalk 4-feet wide around the entire Earth at the equator.)

Whenever he visits the dam, Bernardo says, its historical significance is also inescapable: how it controlled the Colorado’s floods, opened up arid lands for farming and fed the rise of cities across the Southwest. As he describes it, the dam “helped nourish our nation” and helped the West thrive. “We like to show it off,” he says.

With higher lake levels, Hoover Dam's normal capacity is 2,074 megawatts, Bernardo explains, generating enough power per year to supply approximately 450,000 average households. But at today’s lake level, the dam’s capacity has decreased about 25% to 1,567 megawatts, and it’s generating enough power for roughly 350,000 homes.

With every foot the lake declines, about 6 megawatts of power-generating capacity is lost.

The lowest level at which Hoover could produce power is about 950 feet, with an expected capacity of 650 megawatts. If the lake were to fall below that point — a scenario the existing rules are geared toward avoiding — the dam would no longer be able to generate power.

As the reservoir continues to decline, releasing the same amount of water yields a bigger drop in lake level.

“That's one of the concerning pieces,” Bernardo says. “The reservoir is shaped, we call it a teacup, but more like a martini glass. And the lower the elevation goes, the faster the rate of decline.”

That dynamic also affects how much the planned water cuts can help Mead’s level. Under a first-tier shortage next year, for example, Arizona, Nevada and Mexico are preparing for cuts totaling 613,000 acre-feet, which Bernardo says is equivalent to 7-8 feet of elevation in Lake Mead.

If the reservoir were to drop through lower shortage levels to below 1,025 feet, the total cuts among the three states and Mexico would add up to more than 1.3 million acre-feet. That amount, Bernardo says, would equal nearly 20 feet conserved in Lake Mead at those low levels.

When representatives of California, Arizona and Nevada were negotiating the deal, they decided on 1,025 feet as a threshold to avoid, and one they thought the lake would be unlikely to reach. The agreement also includes a backup provision. If the two-year projections show Mead is likely to decline below 1,030 feet, the agreement says the states and the Interior secretary "shall consult and determine what additional measures will be taken."

The government's latest five-year projections, using an approach that considers the river's lower flows over the past three decades, estimates a 25% chance of Lake Mead declining below 1,025 feet in 2025. Much could change, though, with a snowy winter in the mountains.

"We hope and we feel very strongly that the measures that have been put into place should slow down the decline," Bernardo says. "Now, if it's enough to make it recover, your guess is as good as mine, because the hydrology has been so bad."

But if the river basin gets a wet year with average flows, Bernardo says, the cutbacks in the existing plan "will buy us time to get to the next year, in hopes to get a better water year." "And I think that's what the system is designed to do," he says.

**An 'Era of Limits'**

The outlook for the Colorado River has grown increasingly dire over the past several years. In one study, scientists found that about half the trend of decreasing runoff in the Upper Colorado River Basin since 2000 was due to unprecedented warming.

Other researchers warned in a report this year that an "incremental approach to adaptation" is unlikely to be enough in the future. They pointed out that flows from 2000 through 2018 were about 18% less than the 20th century average and said the downward trend will likely continue as temperatures rise with climate change.

Worries about overusing the river predate the current dry spell. In fact, some early warnings came before the legal framework that divided the Colorado among the seven states and Mexico.

John Wesley Powell famously voiced concerns in 1893, some 24 years after his expedition down the river in the Grand Canyon, when he told the attendees at the International Irrigation Congress in Los Angeles: "I tell you, gentlemen, you are piling up a heritage of conflict and litigation over water rights, for there is not sufficient water to supply these lands."

Under the 1922 Colorado River Compact and subsequent agreements, the river has long been severely overallocated. As University of Arizona law professor Robert Glennon has succinctly put it, "there are more water rights than there is water."

So much has been diverted that most of the river's delta in Mexico was transformed decades ago into stretches of dry riverbed that wind through farmlands and desert in the Mexicali Valley. Only a smattering of natural wetlands remain.

In his 1986 book "Cadillac Desert," Marc Reisner wrote that Hoover Dam "rose up at the depths of the Depression and carried America's spirits with it. Its electricity helped produce the ships and planes that won the Second World War, and its water helped grow the food."

But Reisner wrote that from these hopeful beginnings, "the tale of human intervention in the Colorado River degenerates into a chronicle of hubris and obtuseness" and that people in the river basin — at that time only 20 million — "will probably find themselves facing chronic shortages, if not some kind of catastrophe."

"One could say that the age of great expectations was inaugurated at Hoover Dam," Reisner wrote. "And one could say that, amid the salt-encrusted sands of the river's dried-up delta, we began to founder on the Era of Limits."

More recently, authors Eric Kuhn and John Fleck wrote in their 2019 book "Science Be Dammed: How Ignoring Inconvenient Science Drained the Colorado River" that "even absent climate change, we would be in trouble" and that the current problems surrounding the river "are the inevitable result of critical decisions made by water managers and politicians who ignored the science" as early as the 1920s.

Scientific analyses in the 1920s found the Colorado River would be in deficit if dams and canals were built to meet the anticipated demand, Kuhn and Fleck wrote. But the scientists' warnings were ignored, and that "set in motion decades of decisions that would end in the overuse seen today."

They suggested that addressing the river's deficit will require recognizing that the "over-allocation became embedded in basin rules in very specific ways that remain unresolved" and should be fixed.

Negotiating the post-2026 rules will be challenging for everyone involved, Kuhn and Fleck wrote, and some of the fundamental issues facing negotiators now are similar to those a century ago, including questions of how much water the river will provide in the years ahead, and how the system should be governed amid uncertainty.

The Colorado River Basin needs “a stable and effective governance of the use of the river’s waters under conditions where current demands already exceed the exiting supplies,” Kuhn and Fleck wrote. “Like one hundred years ago, the river’s future is not all dark. Innovation, cooperation, and an expanded reliance on science are now the foundation for basin-wide solutions.”

One effort to restore some of the wetlands and ecosystems in Mexico began last month, as water began flowing into the delta under an agreement between the U.S. and Mexican governments. The water releases in the delta, which will total 35,000 acre-feet between May and October, are intended to nourish vegetation and wildlife at habitat restoration sites where conservation groups have planted cottonwoods and willows.

The influx of water is supposed to mimic a small portion of the floods that once swept across the delta toward the Sea of Cortez. This year’s releases amount to a smaller version of a planned flood that coursed through the delta in 2014. In that “pulse flow,” 105,000 acre-feet of water brought back a flowing river in areas that had been dry since floods in the late 1990s.

The releases in the delta this year, using water previously stored in Lake Mead, amount to just 5 inches of water in the reservoir. Much more of the water that passes through Hoover Dam is pumped to Phoenix, Tucson and Los Angeles, and flows through canals to irrigate farmlands along the river from Parker to Yuma, and across the Coachella, Imperial and Mexicali valleys.

**Low water levels bring risks**

If the water were to decline about 125 feet from where it stands, below the elevation of 950 feet, he says, Hoover Dam would lose the ability to generate power. “That's what we call minimum power pool,” Bernardo says. If Mead continues to fall further, the dam could still release water down to a level of 895 feet.

“At 895 and below, Hoover Dam is unable to pass water by any conventional means. So you would essentially have to pump it out of Lake Mead. That's what we call dead pool,” Bernardo says. “And at dead pool, Lake Mead still has 2.5 million acre-feet in storage, but there's just no way to get it out.” If the lake declines that much, only the Southern Nevada Water Authority, which supplies Las Vegas, has an intake deep enough to continue pumping water.

The risks of Mead falling to such lows gave impetus to the last round of negotiations, which led to the 2019 signing of the Drought Contingency Plan at Hoover Dam.

The river would have been in a shortage already years ago if the states and Mexico hadn’t made concerted efforts to prop up Lake Mead’s levels, Bernardo says, and those steps included various conservation programs that have yielded 4 million acre-feet over the past 15 years, representing about 50 feet of water in the lake. But with the unrelenting dry years, he says, “we knew that we couldn't postpone a shortage forever.”

He reiterates that the shortage measures, including the mandatory cutbacks, were adopted to reduce risks.

“And although it's scary that this will be the first time we're using them, they were designed by very smart people throughout the Colorado River Basin,” Bernardo says. “And let's hope that they work the way that they were designed to work.”

If the situation continues to worsen, he says, everyone involved in managing the river’s water will get together again, as stipulated in the 2019 agreements, to take steps to protect the reservoirs. With about 40 million people relying on water from the Colorado and its tributaries, he says, “all of us as water managers have a responsibility to all of those that are in the basin.”

By mid-June, Lake Mead is set to decline to its lowest levels on record. Hoover Dam will soon hold the smallest amount of water since it was filled in the 1930s. The next few years may show how much water use needs to decrease to rebalance the river and reduce the risk that Hoover Dam might one day fall silent.