

MINUTES
BEECH MOUNTAIN TOWN COUNCIL
Town Hall Special Meeting – October 1, 2018

CALL TO ORDER – Mayor Renee Castiglione called the town hall meeting of the Beech Mountain Town Council to order at 4:00 p.m., Tuesday, October 1, 2018 at the Buckeye Recreation Center at 1330 Pine Ridge Road, Beech Mountain, North Carolina 28604. Other Council Members present were Barry Kaufman, Weidner Abernethy, Wendel Sauer. Carl Marquardt was absent. A quorum was present. Staff members present included Town Manager Tim Holloman, Interim Town Clerk Katherine Johnson, Town Clerk, Tamara Mercer, Director of Infrastructure Robert Heaton, Fire Chief Robert Pudney, Utilities Superintendent Daniel Davis and Parks and Recreation Director Sean Royall.

I. *Presentation Outlining the Topic of Discussion Watauga River Intake*

Mr. Robert Heaton, Director of Infrastructure was introduced by Town Manager, Tim Holloman. Mr. Heaton stated that Mr. Benjie Thomas with West Consultants PLLC, would give the presentation and staff would be available for questions and discussion.

Mr. Thomas, Project Engineer with West Consultants, reviewed the topic of the public water supplemental water sources. Mr. Thomas said the Town is served by one central water supply which is from Buckeye Lake. There is the small reservoir, the creek and the dam, which is treated and distributed to town residents' and he stressed all the Towns' water supply comes from that one source. Even though the Town has the new plant to treat the water, the water supply is from the 1980s and is the sole source of drinking. Mr. Thomas noted, that in 2010, due to the drought, the supply almost ran out.

He presented photos of the Lake with the concrete spill-way, which was visibly exposed due to the low water level. In 2010 the water level was so low the Town could hardly draw into the pump station for the treatment plant. He explained the piping system and how it flowed into the treatment plant and said the level was down to 8" to 10". That is at the lowest level for intake to occur which left the lake in a dangerous situation.

Water Quality Consultant, Lee Spencer added that as the lake draws down, it is funnel shaped, so the less area and the less volume per square foot exists. The

Lake level quickly decreases even with water restrictions. This is a dangerous scenario.

In response to Councilman Abernethy's question regarding how many days left or gallons left the town was experiencing, Mr. Spencer said; and Mr. Heaton confirmed, there was only two days left as a supply without re-inflow.

Mr. Thomas presented more photos which depicted the Lake after it rained, the drought, and the levels after rainfall began, he said this led to more investigations as to options to solve this problem. Mr. Thomas continued and said the dam was built in '80s with a development permit issued by the U.S. Army Corp of Engineers, and that permit required the release of a certain amount of flow downstream routinely whether experiencing a drought or not. The actual requirement is for 1 to 1.8 million gallons per day, be released from the reservoir. This is the requirement of the construction permit. The water treatment plant is designed to process 1 million gallons per day. The Town uses 400,000 to half a million gallons per day on average so this is more than the water plant capacity of 1.0 MGD and more than the estimated stream flow during a drought or 7Q10 + 0.45 MGD. The release requirement is to benefit aquatic life downstream. Therefore; the Town is losing water.

Mr. Thomas stated the worst-case scenario is: 0.45 MGD coming into the reservoir and we are letting out 1.8 MGD per day, this quickly depletes the storage in the reservoir. Mr. Spencer clarified that 7Q10 represents the 7 driest days in the year.

Water supply issues can be depleted due to drought, the supply could be contaminated due to chemical spills upstream, there could be a breakdown of equipment there can be many reasons for unusable water so there should always be a secondary water supply in the system.

The State Division of Water Resources is aware of the issues in Beech Mountain noting the system should not be overextended nor should there be more development that could not be sustained. Since current and future water demand exceeds the yield of Buckeye Lake, the State could deny permits for expansion to the water systems. The State has not yet put moratoriums on development but that cannot be ruled out, it could happen said Mr. Thomas.

In response to Councilman Abernethy's question regarding Eagles Nest, Mr. Heaton said they have wells as per the contractor at Eagles Nest.

Town's Option/Alternatives for current water sources/ issues:

- a. Reduce water use, implement restrictions, reduce leaks (current policy)

- b. Expand Lake reservoir / excavate perimeter of Lake/ raise dam and or excavate upstream of dam
- c. Develop groundwater sources/ wells
- d. Draw from another source surface water

II. Open Discussion

Discussion for a common community well versus a single-family home well and how it would operate were clarified by Mr. Thomas. Servicing the supply for more than 15 houses is the threshold then it would flow to the Town's water system, confirmed Mr. Holloman and it would be treated water such as chlorination, etc. Mr. Thomas stated that there is not a close or closer town for Beech Mountain to purchase water from which is what other municipalities do to increase capacity, so we must find other options.

Further topics of general discussion such as reduction of the water usage, and water system loss such as leaks in the distribution system continued. Mr. Heaton noted the new plant system doesn't backwash as frequently which does help with capacity. He cited the Spruce Hollow plant example which did reduce the leakage. Currently the project to replace 3.5 miles of older galvanized lines will help stop leakage from the main lines but mostly it is the street to house structures where leaks occur.

Mr. Frank Steele inquired about 2.5 miles of replaced water lines to which Mr. Heaton addressed the impacts of the hydraulic pump and 2.5 miles of line replacement as well as a current capital project to replace 3.3 miles of old galvanized line which will eliminate that leakage. This project includes 142 service connections to be updated at once. Those fittings leak noted Mr. Heaton. The Town benefited by approximately 15 -16% but it is difficult to gage it. He added that every joint is leaking there is no feasible way to stop every coupling from mechanical leakage and there are approximately 27,000 couplings not counting the services.

Mr. Spencer pointed out that because we are on a mountain, the system has higher pressures in it than other systems have. Pressure reducing valves have been installed to control it but if there's a leak we still lose more water due to the higher pressure.

Mr. Thomas discussed how calculations were derived for leak levels and noted that some are still unaccounted for such as ground leaks or low meters may read incorrectly in the lake. The consultants estimate that approximately 150,000 gallons per day of leakage occurs into the ground, or roughly 1/3 leakage.

Mr. Spencer said conservation and 'man management' is encouraged by the State. The new meters and the water line replacement by the Town was recognized as still not enough in the State report. The State report cited the Town must have a secondary supplementary source. Repercussions by the State maybe no new structures are permitted, and a moratorium maybe mandated which would affect property values.

Expansion of the reservoir for more capacity storage was reiterated by Mr. Thomas and the reclassification of the watersheds is not required. There may be increased costs for operating and for the maintenance of the higher dam.

Further disadvantages for the raised dam was discussed including the high cost, extensive permitting due to high hazard stream impacts, and still there will be only one water source. Construction of the dam would cause interference for the water treatment plant such as stirring up sediment, creating a contaminated intake into the facility which may cause facility fail. It could get as low as the 7Q10 as previously referred to, and the estimated increase is still only 63 MGD which is not much more for the expected demand.

The development of other ground water sources was addressed by Mr. Thomas. This source would still need to be treated and current well and new drilled wells must be tested. Mayor Castiglione cited the Shane Outpost Park water feature as an example. Mr. Heaton expounded on the current situation at Shane Park. He said that well blew off at 200 gallons per minute, but the Town might only get 90 out of it after the draw-down. He added the State rule is that it can only run for 12 hours then it must have a recharge time of 12 hours. It could yield 1/200 gallons per minute but could reduce to less than 20 during a drought. The cost maybe half a million dollars.

Over time the yield gets lower said Mr. Heaton, on a mountain we don't have a large basin for recharge, hard rain is runoff down into the creeks from the mountain. Mr. Thomas agreed and said over time the yield drops off and the uncertainty associated with the wells forces us to find a more permanent solution.

Councilman Sauer noted that when asking to draw from the Watauga River as a source, the Town needs to disclose that all other options were sought. To which Mr. Thomas agreed and said all options must be vetted. The uncertainties are the costs, environmental impact, metals, the PH, and water quality characteristics. The State data report contained the States recommendations. Draw down tests were required for the mountain.

Further discussion of the possible well sites, the costs, and the topography and geology investigations were noted. Mr. Heaton said that it could cost 200,000

for an 8" casing with a 6" well pump on private property. He said the geologist study spotted 9 possible sites. Current plans are to drill four sites which the Town owns and then evaluate the wells drilled. It was stated that there are lots that are unbuildable and private, it is difficult to get to those lots to be tested.

Examples that were attempted and did not work were given by Mr. Thomas. Mr. Spencer noted other concerns regarding water from a spring well. He explained what regulations are required to be met to construct a system. He explained that permittable well minimum requirements need to be in a dry area and the water quality must be tested and that water would go directly into the treatment system not into Buckeye Lake.

It was noted by Mr. Thomas that even for a manmade lake for emergencies there must still be a minimum release as a requirement by the State. Mr. Heaton explained that the pristine streams are highly regulated as these are high quality trout streams and are stringently regulated by state. The vegetative buffers must be met. As to storage of water, older stored water can become too old, if that happens it cannot be used or go back into the distribution system.

In conclusion, Mr. Thomas said the Town must draw from another surface water source. The nearest rivers with significant capacity other than Buckeye are the Elk River and Watauga River. Elk is further from the water treatment plant and has less capacity than the Watauga River. The Watauga is high quality water. If the Watauga could be used as a source, a small amount would be withdrawn. Per USGS the river has an even flow of approximately 158 MGD and a 7Q10.

In response to Mayor Castiglione question regarding the 2010 drought year, Mr. Thomas said the Watauga River was fine during the drought. This data was supplied by Army Corp of Engineers looking back 10 years.

Mr. Thomas reviewed the maps and said there would need to be 7.5 miles of pipeline to the Watauga River and would be approximately 12-14" pipe. This would be the least impactful to the environment. He explained the method for digging a trench behind the riverbank to hide the pipes. This would infiltrate the river and the piping would run to a pump station along NCDOT roads. After permitting actual construction would take about two years. Disadvantages to this would be the high cost as well as the O&M costs, during dry years; it will require more pumping and we must have county government cooperation to complete the project. Mr. Thomas stressed extensive permitting would be required.

Current steps that have been taken thus far were reviewed by Mr. Spencer and he clarified the restrictions and procedures process. It was noted that there was opposition to the request by the citizens of Watauga County the first time this request was addressed. He said the commissioners had agreed with the request but

at the public hearing citizens were not concerned with land restriction but with the perception of losing their water. If the situation digresses, the State might have to overrule but they don't want to interfere with local and county government.

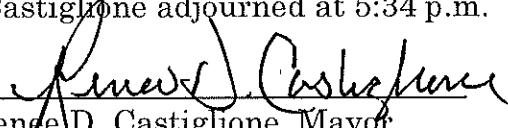
As an aside Mr. Spencer stated the original permit for Buckeye should not have been permitted as it was, if requested today as per regulations it would not be allowed. The safe yield is not there, and the State and Federal agencies permitted it incorrectly as it is a water plant that does not have enough water supply.

Elk River was discussed, and it was noted that the flow upriver would be problematic, and the Elk simply does not have enough capacity. The reclassification of the Watauga River to allow it to become a drinking water source, means working with the local governments. Mr. Holloman added that in February and March, we will work with the newly elected officials and educating the public on the issue and work with the new commissioners on a resolution to enforce the land use regulations.


The Environmental Management Commission also signs off on an agreement to protect the land use so that also needs to be in place, a resolution from the county, which they may or may not be saying they support. Then the State will enforce it, or it may be that a state senator may strike it down. All the outcomes for and against were discussed.

It was stated that the Town must work on the public information campaign and make the case that the secondary water supply, would be tapped as needed. The financial costs were further discussed, and Mr. Thomas reiterated that the minimum amount of release water needs to be re-evaluated. The amount of water released downstream that Buckeye reservoir is required to release is a burden especially in years of drought. These are current State and Federal requirements and current minimums are not achievable during droughts. The plan is to have the fish and wildlife agency re-calculate the true need for the fisheries. Mr. Thomas said reducing the minimums would will be a major factor in determining and calculating the supplemental water supply needed.

There being no further business Mayor Castiglione adjourned at 5:34 p.m.


Rene D. Castiglione, Mayor

ATTEST:


Tamara Mercer
Town Clerk



TOWN OF BEECH MOUNTAIN SUPPLEMENTAL WATER SOURCE PROJECT

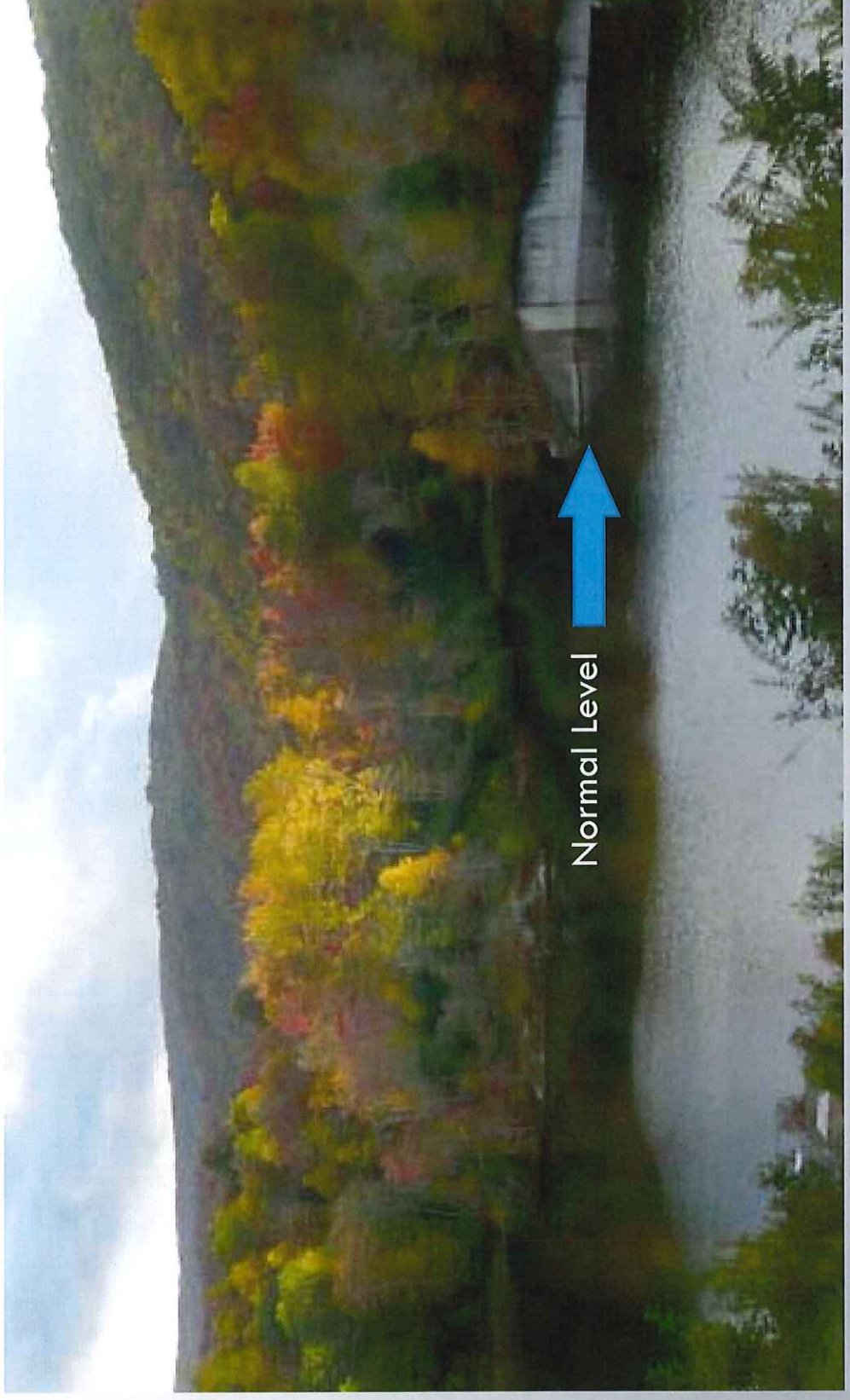
TOWN HALL MEETING
OCTOBER 1, 2018





**CURRENT AND ONLY WATER SOURCE:
BUCKEYE LAKE (MAN-MADE RESERVOIR ON
BUCKEYE CREEK)**

BUCKEYE LAKE WATER LEVEL- NORMAL POOL



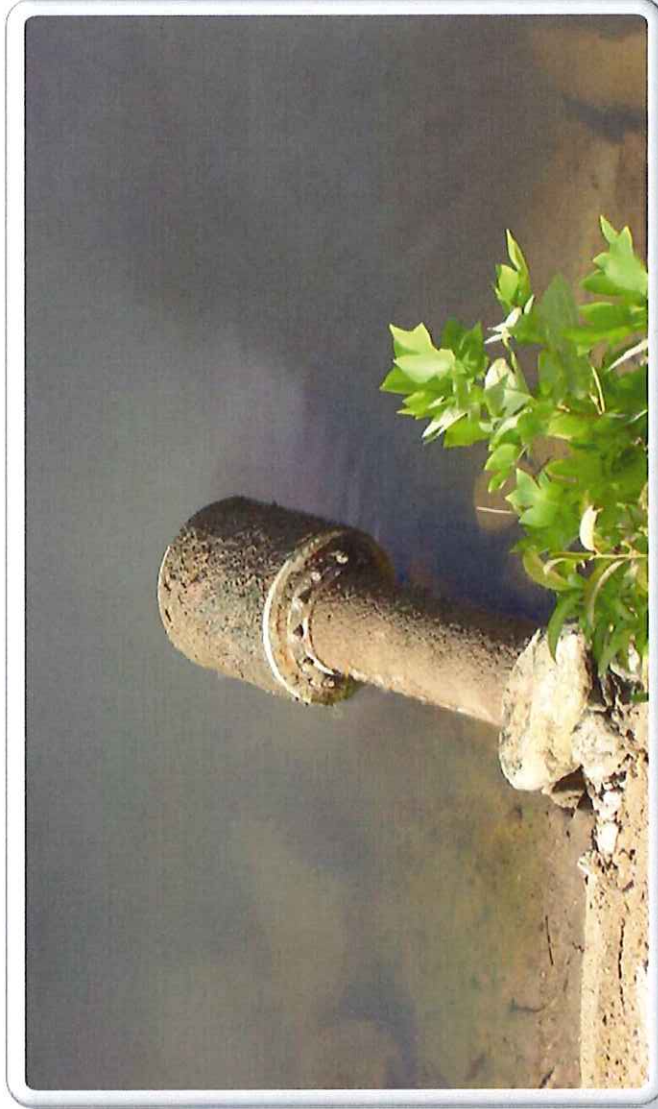
WHY DOES BEECH MOUNTAIN NEED ANOTHER DRINKING WATER SOURCE?

In 2010, a drought caused the water level in Buckeye Lake to drop perilously close to empty (to the level of the lowest intake pipe).



**BUCKEYE LAKE WATER
LEVEL- JULY 30, 2010
AT STAGE II WATER
RESTRICTIONS**

- THIS PHOTO
ILLUSTRATES THE 2ND OF
3 WATER INTAKES. AT ITS
LOWEST, THE WATER LEVEL
WAS ONLY 8" - 10" ABOVE
THE 3RD (AND FINAL)
INTAKE.**



**BUCKEYE LAKE WATER LEVEL- AUGUST 2010
STAGE III WATER RESTRICTIONS
(DAY AFTER RAINFALL THAT BEGAN THE END OF
DROUGHT)**



WHY DOES BEECH MOUNTAIN NEED ANOTHER DRINKING WATER SOURCE?

A minimum flow must always be released below the dam

1.0 to 1.8 million gallons per day (MGD) are to be released from the reservoir (a requirement of the dam construction permit). This is more than the water plant capacity of 1.0 MGD and more than the estimated stream flow during a drought (7Q10 = 0.45 MGD)

Worst case: 0.45 MGD coming in to the reservoir and 2.8 MGD going out



WHY DOES BEECH MOUNTAIN NEED ANOTHER DRINKING WATER SOURCE?

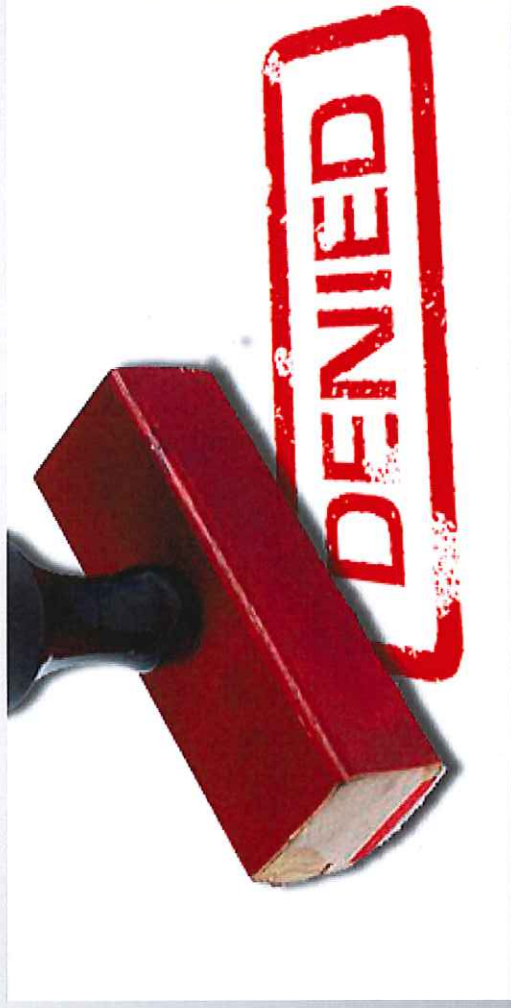
Although not mandatory, an emergency or supplemental source of water is a best practice for any water system. It provides water when the primary source is:

1. Depleted due to drought
2. Contaminated due to chemical spills, upstream erosion, wastewater spills, etc.
3. Unusable due to failure of equipment at the primary source (such as clogged screens, pump breakdowns, etc.)



WHY DOES BEECH MOUNTAIN NEED ANOTHER DRINKING WATER SOURCE?

Since current and future water demand exceeds the yield of Buckeye Lake during times of drought, the State could deny permits for expansions to the water system.



The background of the slide is a close-up photograph of water droplets on a textured, light-colored surface. The droplets vary in size and are scattered across the frame, with some showing highlights and shadows that give them a three-dimensional appearance. The overall tone is soft and natural.

**WHAT CAN THE
TOWN DO TO
ADDRESS THIS
SITUATION?**

POSSIBLE SOLUTIONS TO THE PROBLEM

- A. REDUCE WATER USE
- B. EXPAND BUCKEYE LAKE (RAISE DAM AND/OR EXCAVATE UPSTREAM OF THE DAM)
- C. DEVELOP GROUNDWATER SOURCES (WELLS)
- D. DRAW FROM ANOTHER SURFACE WATER

Note: other alternatives, such as purchasing water from another water system are not feasible, and therefore ruled out.

REDUCE WATER USE



Current unaccounted-for water use is about 47%. Some of this is related to inaccuracies in meters and accounting, but much of it is actual leakage from the distribution system. Leaks in the water system are being addressed by gradually replacing all galvanized steel pipe and faulty service lines, but this will take many years since there are over 60 miles of these lines



- * New Water Plant uses less process water
- * Recent \$1.6 million Spruce Hollow Transmission main project replaced about 2.5 miles of old mains
- * About 3.3 miles of old water mains and 142 service connections are to be replaced in a current \$1.74 million project



Conservation is encouraged through voluntary and mandatory water use restrictions, implemented according to the Town's Water Shortage Response Plan. Increased water rates also tend to encourage conservation.

EXPAND BUCKEYE LAKE

Benefits:

1. Reduced risk of running out of water
2. Reclassification of watersheds would not be required
3. Same O&M costs except perhaps for maintenance of higher dam

		Estimated Reservoir Yields During Drought*		
Minimum Release Scenario	Current Reservoir	Raise Dam 10'	Raise Dam 10' & Excavate Finger	
Current (0.97 to 1.8 MGD)	0.0 MGD	0.0 MGD	0.10 MGD	
DWR Draft Proposed (varies with stage)	0.24 MGD	0.32 MGD	0.47 MGD	
7Q10 Constant	0.30 MGD	0.50 MGD	0.63 MGD	

* Estimates are preliminary and subject to change

EXPAND BUCKEYE LAKE

- DISADVANTAGES:
- HIGH COST
- EXTENSIVE PERMITTING DUE TO HIGH HAZARD DAM AND STREAM IMPACTS
- STILL PROVIDES ONLY ONE WATER SOURCE WITH NO ADDED PROTECTION IF PRIMARY SOURCE DEPLETED, CONTAMINATED, OR INTAKE FACILITIES FAIL
- INTERFERENCE WITH WATER TREATMENT DURING CONSTRUCTION
- EVEN BEST CASE SCENARIO OF 0.63 MGD YIELD BARELY MEETS PROJECTED NEED
- RISK OF MINIMUM RELEASE DEPLETING STORAGE

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DEVELOP GROUNDWATER SOURCES (WELLS)



One well has been developed at the head of Buckeye Lake. It will not serve as a separate source but could be used to pump some groundwater into the lake during a drought.



More wells could be developed. The yield of wells in mountain geology is very uncertain, both initially and long term.



The Town plans to drill at least one more well. Depending on the success of this one and on the availability of other suitable well sites, the Town may continue drilling more wells.

DEVELOP GROUNDWATER SOURCES (WELLS)

Benefits:

- Lower Cost (if not too many wells are needed)
- Relatively uncomplicated compared to other alternatives
- Each well stands alone and can be used when other sources are not available

Disadvantages:

- Much uncertainty with immediate and long term yields
- Each well must be on land under the control of the Town and free of contamination potential. Power and access roads must be extended to each well.
- Treatment at each well may be different depending on levels of metals, pH, and other water quality characteristics

DRAW FROM ANOTHER SURFACE WATER

- The nearest rivers with significantly more capacity than Buckeye Creek are Elk River and Watauga River. Elk River is further from the water plant and has less capacity than the Watauga River.
- If the Watauga River were used as a source, a relatively small amount would be withdrawn:
 - Per USGS, the river has an average flow of about 158 MGD and a 7Q10 (the lowest stream flow for seven consecutive days that would be expected to occur once in ten years) of 17 MGD.
 - Currently, Beech Mountain would only need an average of 0.4 MGD during a drought. Future demands are difficult to predict, but even at 3.0 MGD, the withdrawal would only be 18% of the 7Q10.

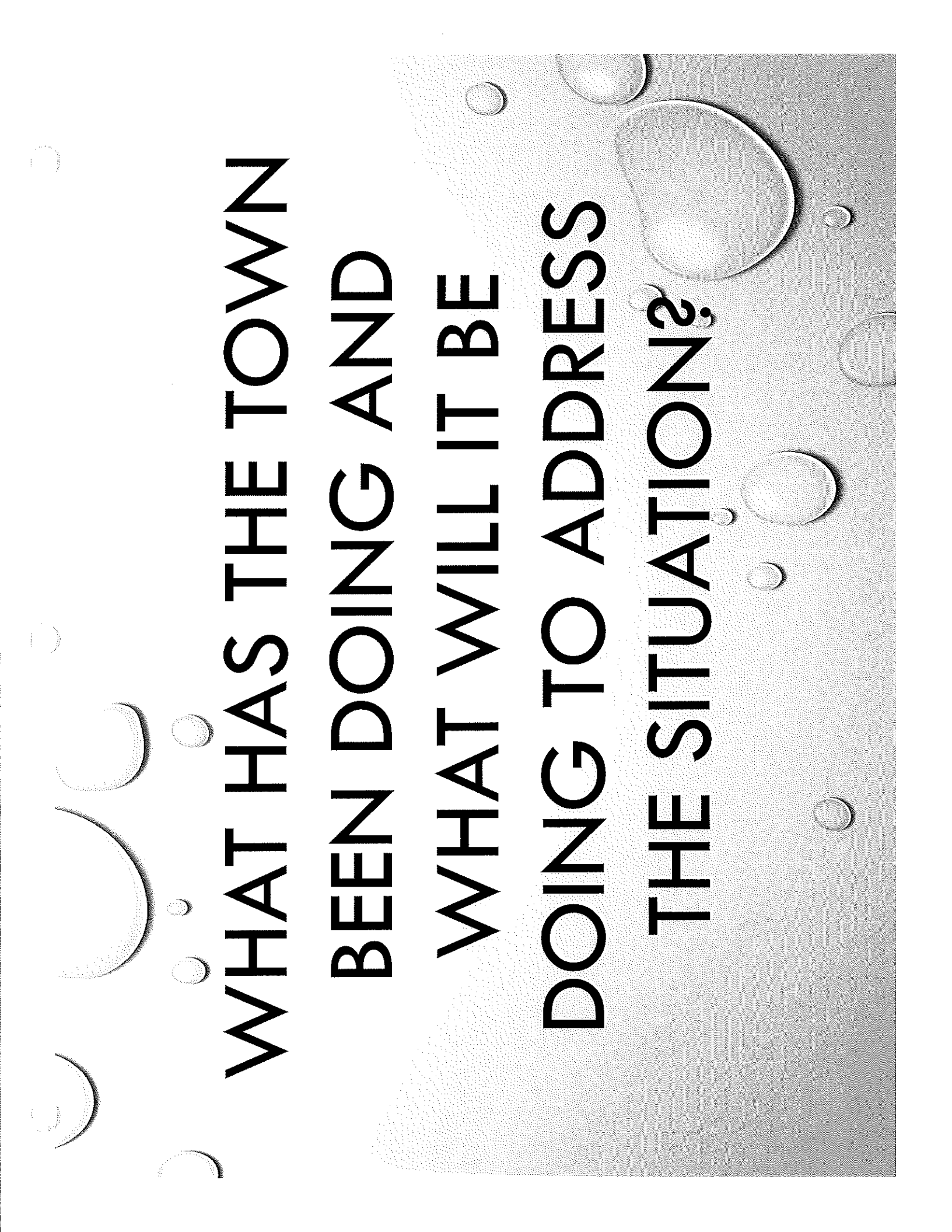
DRAW FROM ANOTHER SURFACE WATER

Benefits:

- Ample supply
- High quality water
- Separate from current source
- Little interference with existing plant during construction

Disadvantages:

- High capital cost
- Significant O&M cost, but will vary with need (i.e., dry years will require more pumping)
- Reclassification of Watauga River watershed required
- Extensive permitting

The background features a light gray, textured surface with several realistic water droplets of varying sizes scattered across it. On the left side, there is a faint, circular graphic element that appears to be a stylized globe or a similar abstract shape.

**WHAT HAS THE TOWN
BEEN DOING AND
WHAT WILL IT BE
DOING TO ADDRESS
THE SITUATION?**

STEPS TAKEN AND UNDERWAY

1. Working with the Division of Water Resources (DWR) to define the problem and identify solutions. DWR assisted by gathering information and issuing a report.
2. Various Meetings with DWR, TVA, USACE and others to determine steps and requirements toward permitting a Watauga River intake.
3. Updating cost estimates for the alternatives and especially for the Watauga River intake option.
4. Taking steps toward the reclassification of the Watauga River (to allow it to become a drinking water source).
 - Watauga County commissioners will be asked to pass a resolution that land use restrictions will be enforced according to State laws for a WS IV watershed.
5. Wells are being drilled.

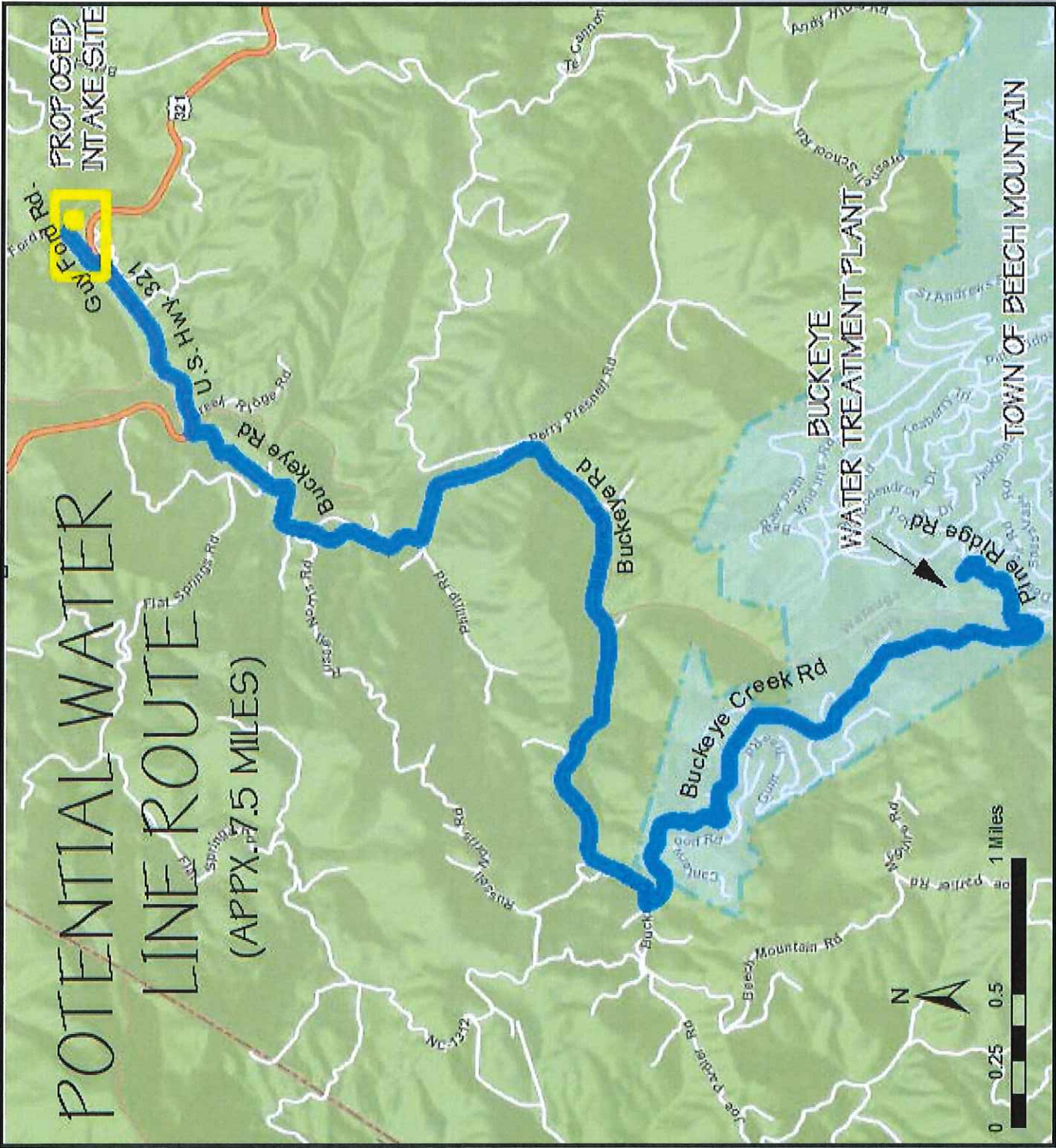
STEPS TAKEN AND UNDERWAY – MINIMUM RELEASE EVALUATION

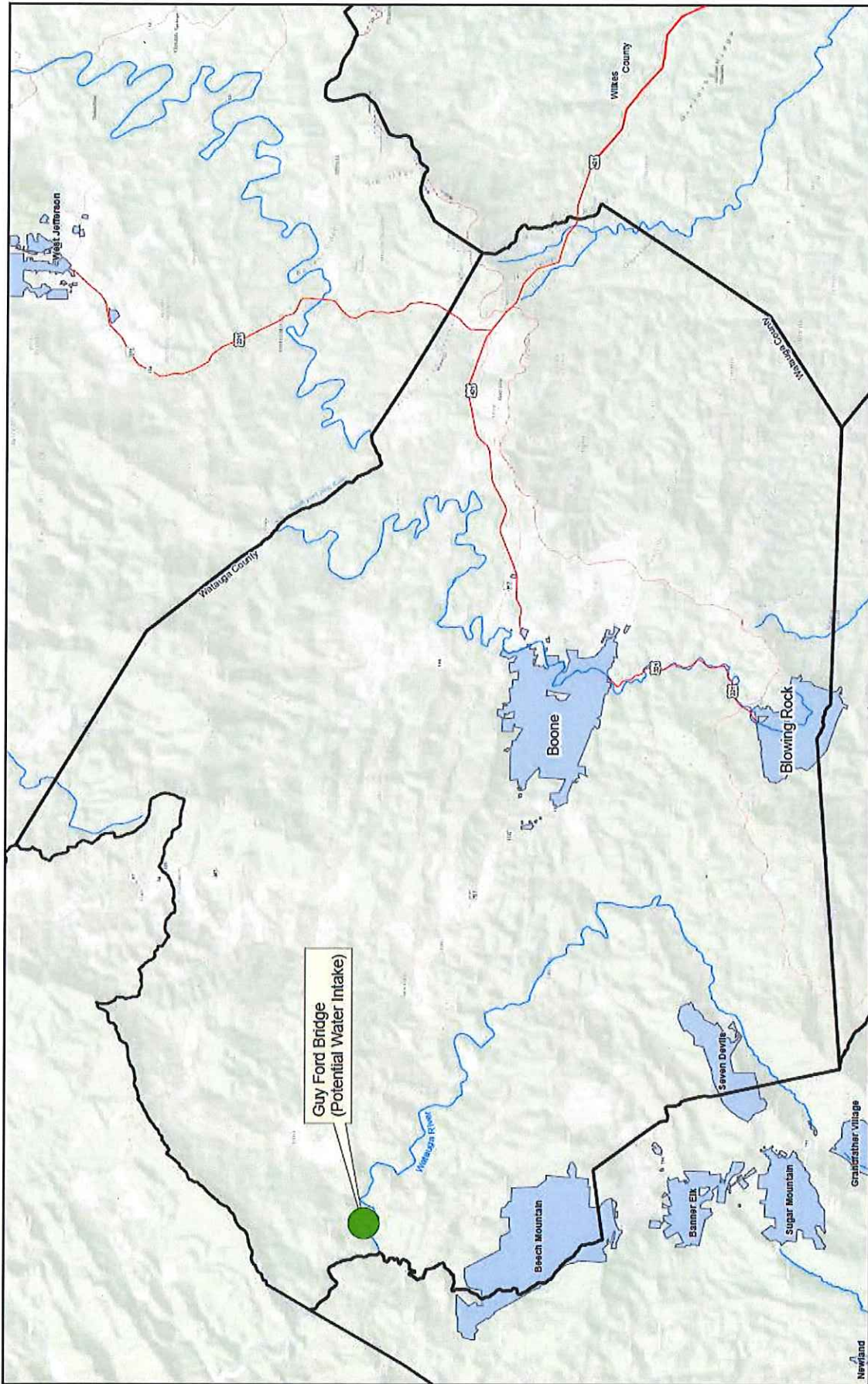
- The amount of water released downstream from Buckeye Lake must meet certain minimums even during a drought. This is a State and Federal requirement. The current minimums are not achievable during droughts such as the Town experienced in 2010. Therefore, studies are underway to possibly reduce the required minimums
- The minimums finally determined will be a major factor in calculating the supplemental water needed.

MAPS

POTENTIAL WATAUGA RIVER INTAKE

POTENTIAL WATER LINE ROUTE (APPX. 7.5 MILES)





Guy Ford Bridge
(Potential Water Intake)

NOTES:
 1. WATERSHED Delineated BY USGS/USDA
 2. SEVEN DEVILS MAINTAINED FROM 2010 NC
 PLANNING COMMISSION ACQUISITION.
 REVISION NO. 1 08/16/13

LEGEND

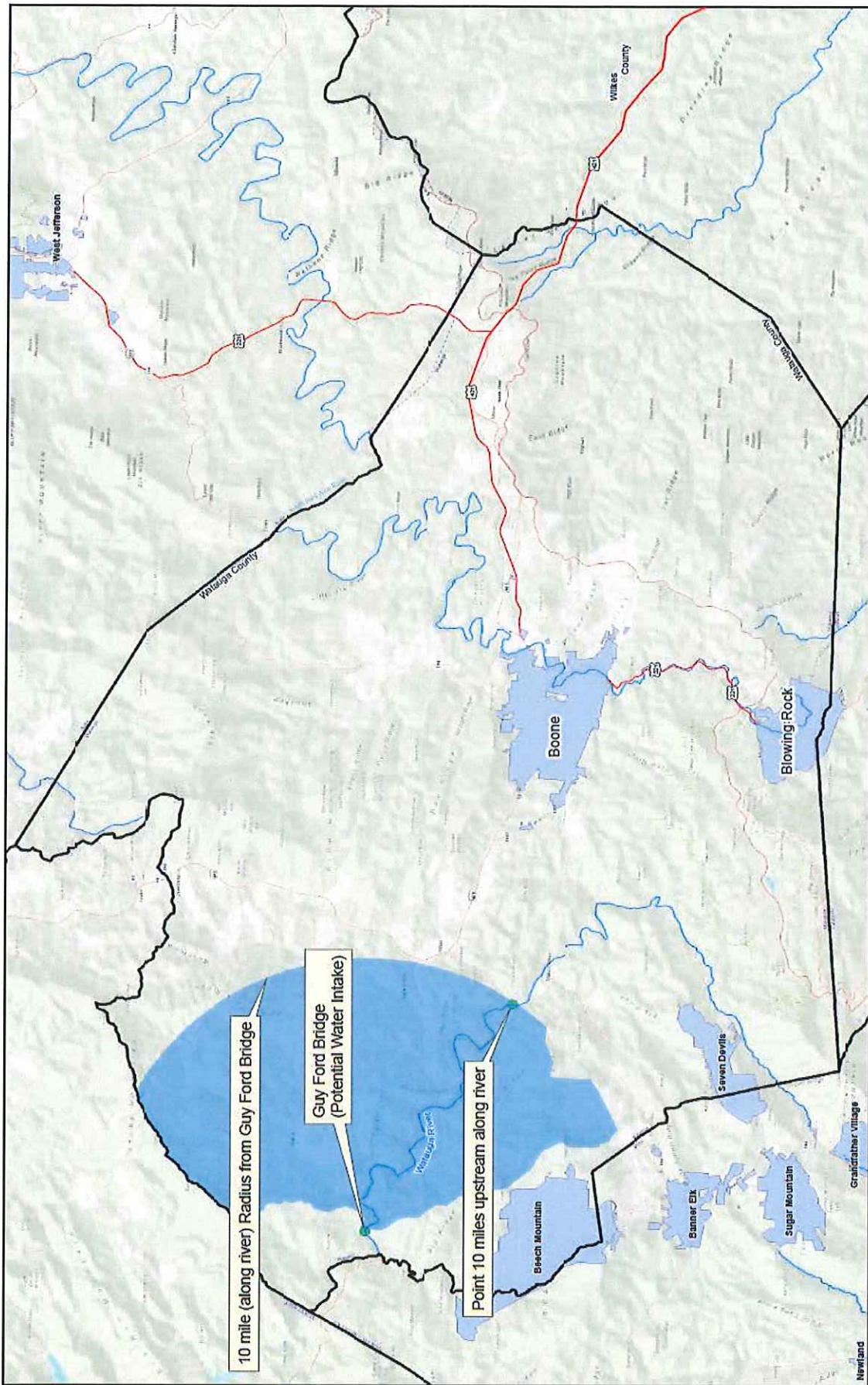
 Protected Watershed Area
 Rivers
 Potential Intake Point/ Point 10 miles upriver
 Municipal Boundaries

MAP DATA:

 3 1.5 0 3 Miles
 1 in = 1 mile

PROPOSED WATERSHED RE-CLASSIFICATION
 FOR TOWN OF BEECH MOUNTAIN
 WATAUGA RIVER INTAKE PROJECT

 N



10 mile (along river) Radius from Guy Ford Bridge

Guy Ford Bridge
(Potential Water Intake)

Point 10 miles upstream along river

NOTES:

1. WATERSHED DELINEATED BY SURVEY.
2. RIVER STRAIGHTENED FROM ORIGINALLY FROM 2010 NC SURVEY DATA.

REVISION NO. 1 02/16/13

LEGEND

- Protected Watershed Area
- Rivers
- Potential Intake Point/ Point 10 miles upriver
- Municipal Boundaries

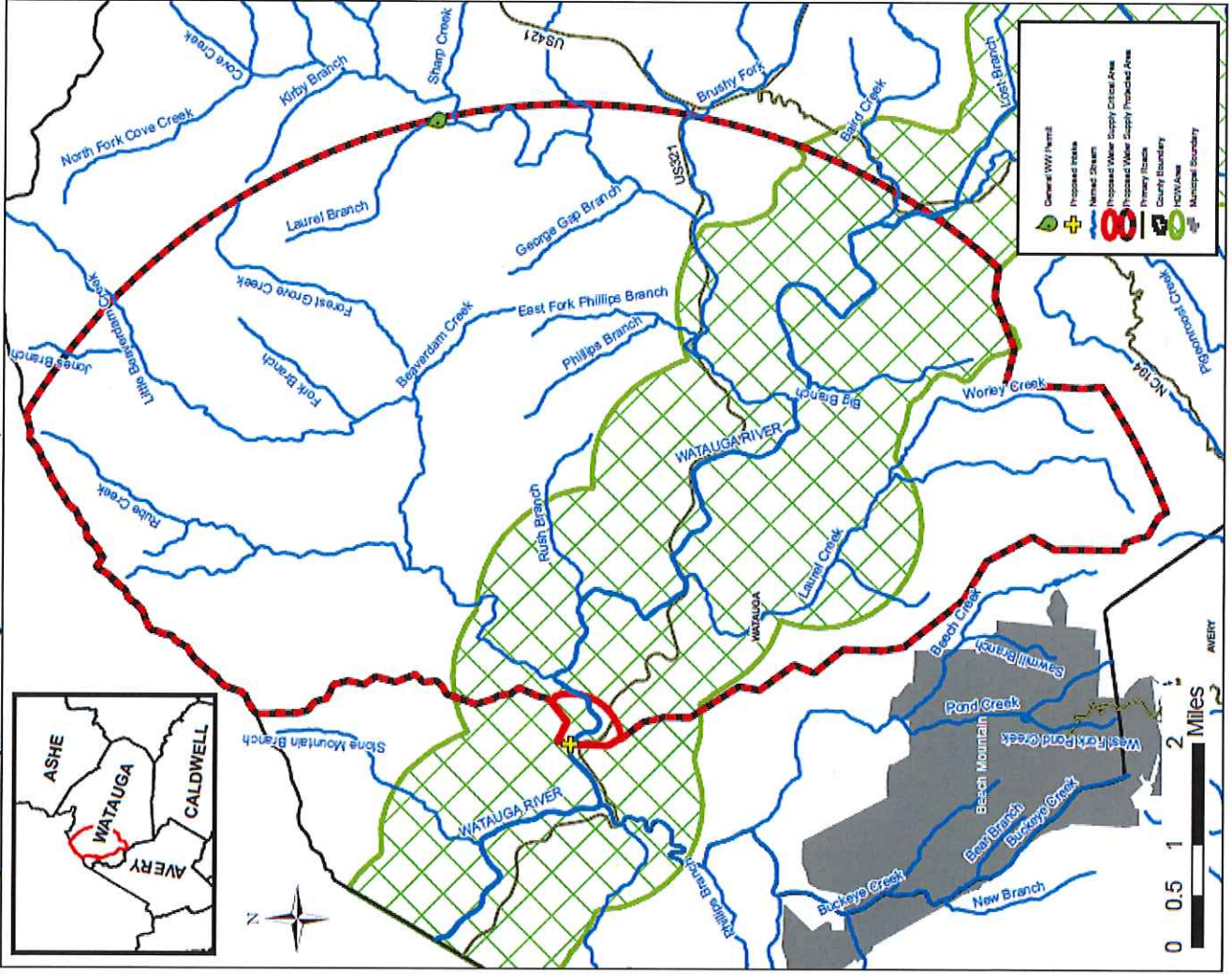
MAP DATA

3 1.5 0 1.5 3 Miles

1 in = 1 mile

PROPOSED WATERSHED RE-CLASSIFICATION FOR TOWN OF BEECH MOUNTAIN WATAUGA RIVER INTAKE PROJECT

Watauga River Proposed WS-IV Watershed Watauga County, Watauga River Basin, North Carolina



CONCLUSION

The Town of Beech Mountain will need one or more sources of water to supplement the existing Buckeye Creek and reservoir source. Reduction of water demand and leakage is to continue, but this alone will not fully address the need.



The best approach to meet this need appears at this time to be two-pronged:

1. Develop one or more groundwater wells, so long as the yields are significant enough to justify the cost and to offset the inherent risk of declining yields in the future.
2. Continue planning, design, and permitting for an intake on the Watauga River as the best long-term solution.



The requirements for aquatic life in Buckeye Creek must be evaluated so that a more reasonable minimum release can be established, subject to approval by the US Army Corps of Engineers. This is a critical step before calculations of total water need can be finalized.

