US Army Corps of Engineers ®
Wilmington District

FINDING OF NO SIGNIFICANT IMPACT

A DEMONSTRATION PROJECT SHOWING
THE IMPACT OF FLOATING IN-LAKE
LONG-DISTANCE CIRCULATORS
IN
B.E. JORDAN LAKE

July 2014

Finding of No Significant Impact
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1.0 INTRODUCTION

The National Environmental Policy Act of 1969, as amended (NEPA), requires consideration of the environmental impacts for major federal actions. The proposed action and the environmental impacts of the proposed action were addressed in the Environmental Assessment for A Demonstration Project Showing the Impact of In-Lake Long-Distance Circulators in B.E. Jordan Lake (EA), dated March 2014. The EA was coordinated with various regulatory agencies and the public and comment letters were received. This Finding of No Significant Impact (FONSI) documents the environmental considerations, the decision that no significant impacts would occur if the proposal is implemented, and explains the rationale used in selecting the alternative proposed for implementation.

This FONSI has been prepared pursuant to NEPA in accordance with the Council on Environmental Quality (CEQ) regulations as contained in 40 CFR Parts 1500 to 1508, which directs federal agencies on how to implement the provisions of NEPA.

2.0 PROPOSED ACTION

The Federal action for the demonstration project is the granting of a USACE real estate license to the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The National Environmental Policy Act of 1969, as amended (NEPA) requires that the environmental consequences of Federal actions be evaluated, and the details of this proposed action, and the potential environmental consequences must be presented to the public. The purpose of this Environmental Assessment (EA) is to provide a summary of this evaluation and facilitate review by relevant government agencies and the public.

The real estate license is required to authorize NCDWR's proposed demonstration project which would place a total of 36 floating in-lake long-distance circulators within Jordan Lake. Twenty-four circulators would be deployed in the Morgan Creek Arm of Jordan Lake and 12 would be placed in the Haw River Arm of Jordan Lake for a 24 month period (See Appendix A). The circulators are designed to upwell water from near the bottom of the epilimnion to the surface of the lake. According to the State, the circulators are expected to improve water quality by suppressing phytoplankton activity such that chlorophyll a, pH, and turbidity measurements would meet State water quality standards within the project areas. Water quality would be monitored within the project areas and compared with data collected outside of the project area as well as historically collected data. Such comparisons would allow the NCDWR to verify if this project is having the intended results.

3.0 CHANGES TO ENVIRONMENTAL ASSESSMENT

Section 1.0 of the EA, entitled: "Introduction", contained incorrect information concerning the method by which circulators will draw water from depth to the surface in project areas. This section has been revised and corrected by updating paragraph seven to read as follows:

> This Environmental Assessment (EA) addresses a request for a proposed demonstration project which would place a total of 36 floating in-lake long-distance circulators within Jordan Lake. Twenty-four circulators would be deployed in the Morgan Creek Arm of Jordan Lake and 12 would be placed in the Haw River Arm of Jordan Lake for a 24 month period. The circulators will

> upwell water from near the bottom of the epilimnion to the surface of the lake. According to the State, the circulators are expected to improve water quality by suppressing phytoplankton activity such that chlorophyll *a*, pH, and turbidity measurements would meet State water quality standards within the project areas. Water quality would be monitored within the project areas and compared with data collected outside of the project area as well as historically collected data. Such comparisons would allow the NCDWR to verify if this project is having the intended results of reducing chlorophyll *a*.

Section 4.0 of the EA, entitled: "Proposed Action – Demonstration of Solar Powered In-Lake Long-Distance Circulators", contained incorrect information concerning circulator installation locations. This section has been revised and corrected by updating paragraph 16 (final paragraph) to read as follows:

> The Morgan Creek Arm circulators could be deployed from the boat ramp at Farrington Point; the Haw River Arm circulators could be deployed from the Robeson Creek boat ramp (Figure 31). A small, temporary staging area would likely be needed to assemble and prepare the circulators. The location of this staging area is currently unknown. No long term or short term storage is anticipated and the boat ramps would remain open to the public during deployment. Once circulators are placed in the water, they would be towed to the individual deployment sites by boat. To ensure boater safety and to maximize project efficiency and effectiveness, final circulator positions may differ slightly from those featured in Figure 9 based on comments received during public review and in-lake conditions at time of installation. Should final circulator positions be altered by greater than 200 ft or 50 ft in the Morgan Creek and Haw River project areas, respectively, the State will coordinate circulator locations with the North Carolina Wildlife Resources Commission (NCWRC) and the USACE to minimize boater safety hazards. Should a safety issue arise after installation of circulators, NCWRC will coordinate with the contractor concerning more appropriate locations.

4.0 ALTERNATIVES CONSIDERED

Four alternatives were considered, three of which would require a real estate license provided by USACE:

- No Action
- Solar Powered In-Lake Long-Distance Circulators
- AC Powered In-Lake Long-Distance Circulators
- Wind Powered In-Lake Long-Distance Circulators.

After considering solar powered, AC powered, and wind driven in-lake long-distance circulators from various manufacturers, the State selected solar powered in-lake long-distance circulators as the preferred alternative to be implemented (real estate license provided) for the proposed demonstration project. Two alternatives considered but not retained for comparison in Section 5 (Environmental Consequences) were:

- AC Powered In-Lake Long-Distance Circulators
- Wind Powered In-Lake Long-Distance Circulators.

5.0 PUBLIC AND AGENCY COORDINATION

On March 7, 2014 the Environmental Assessment for A Demonstration Project Showing the Impact of In-Lake Long-Distance Circulators in B.E. Jordan Lake (EA) which contained a Draft Finding of No Significant Impact (FONSI) was mailed to federal and state agencies and the interested public for a 30-day review and comment period. The EA, as well as the comments received from the public have been

considered in the decision to prepare this FONSI in accordance with NEPA requirements. Correspondence was received from the following agencies and groups, as well as a number of private citizens.

Letters and memoranda on the EA were received from the following:

Federal Agencies

- National Oceanic and Atmospheric Administration, National Marine Fisheries Service
- US Environmental Protection Agency, Region 4
- US Fish and Wildlife Service

State Agencies

- North Carolina Wildlife Resources Commission

Local Communities

- Town of Cary, NC

Elected Officials

- None

Conservation Groups

- Haw River Assembly
- North Carolina Wildlife Federation (National Wildlife Federation affiliate)
- Sierra Club, North Carolina Chapter
- Southern Environmental Law Center (on behalf of the North Carolina Conservation Network)

Interested Businesses

- Aqua Sierra, Inc.
- General Environmental Systems, Inc.
- Medora Corporation
- Stormwater Services Group, LLC

Interested Public

- Numerous comments from the public were received.

Comments received primarily concerned aesthetic resources, clean water act and regulatory compliance, available scientific evidence to support project implementation, public safety, consideration of additional alternatives, impacts to wildlife, past State legislative action, and nutrient inputs. None of the comments received identified any reasonable alternatives or major substantive issues that were not already addressed in the EA. Comments on the EA and responses to comments are provided in Appendix B.

6.0 IMPACTS OF THE PROPOSED ACTION

The proposed action is not expected to have significant adverse impacts to the human environment. A summary of project impacts is presented in Table 1.

Table 1. Environmental Impacts Comparison of Proposed and No Action Alternative

Resource	Proposed Alternative	No Action Alternative
Physical Environment		
Geology	No adverse impact to geology in project study areas	No adverse impact to geology in project study areas
Topography	No adverse impact to topography in project study areas	No adverse impact to topography in project study areas
Soils	No adverse impact to soils in project study areas	No adverse impact to soils in project study areas
Floodplains	No adverse impact to floodplains in project study areas	No adverse impact to floodplains in project study areas
Surface Hydrology	No adverse impact to surface hydrology in project study area	No adverse impact to surface hydrology in project study area
Water Quality	No adverse impact to water quality	No adverse impact to water quality
Air Quality	No adverse impact to air quality in project study areas	No adverse impact to air quality in project study areas
Noise	Adverse impact; will lead to very minimal increase of noise in project study areas	No adverse noise impacts in project study areas
Cultural Resources	No adverse impact to cultural resources in project study areas	No adverse impact to cultural resources in project study areas
Hazardous Waste Sites	No adverse impact; there are no hazardous waste sites in project study areas	No adverse impact; there are no hazardous waste sites in project study areas
Aesthetics	Minor adverse effect on aesthetics in project study areas	No adverse impacts to aesthetics in project study areas
Natural Resources		
Vegetation	No adverse impact on vegetation in project study areas	No adverse impact on vegetation in project study areas
Fish and Wildlife	No adverse impact; may improve fishery resources in project study areas	No adverse impact to fish and wildlife populations in project study areas
Threatened and Endangered Species	No affects on endangered or threatened species in project study areas	No affects on endangered or threatened species in project study areas
Wetlands	No adverse impact on wetlands within project study areas	No adverse impact on wetlands within project study areas
Socioeconomic Characteristics		
Land Use	No adverse impact on current or future land use in project study areas	No adverse impact on current or future land use in project study areas
Transportation	No adverse impact on transportation in project study areas	No adverse impact on transportation in project study areas
Recreation	Adverse impact in that boaters will not be able to anchor within 100 feet of circulators	No adverse impact to recreation
Water Supply and Conservation	No adverse impact on water supply	No adverse impact on water supply
Energy Needs	No additional energy needs except for those needed for deployment, maintenance, and retrieval of circulators	No additional energy requirements
Safety	Would pose minor safety concerns in project study areas	No new safety concerns in project study areas
Consideration of Property Ownership	No adverse impact to ownership; will require real estate license from USACE	No adverse impacts to ownership in project study areas

7.0 FINDING OF NO SIGNIFICANT IMPACT

I have reviewed the Environmental Assessment for A Demonstration Project Showing the Impact of In-Lake Long-Distance Circulators in B.E. Jordan Lake, the information provided by interested parties, and the information contained in this Finding of No Significant Impact, and I find that the proposed action will not significantly affect the quality of the human or natural environment. Therefore, preparation of an Environmental Impact Statement pursuant to Section 102(2)(c) of the National Environmental Policy Act of 1969, as amended, is not required.

Date: 8 JULY 2014

Steven A. Baker
Colonel, U.S. Army
District Commander

APPENDIX A
EXHIBITS

Exhibit 1. Location of Jordan Lake Watershed.

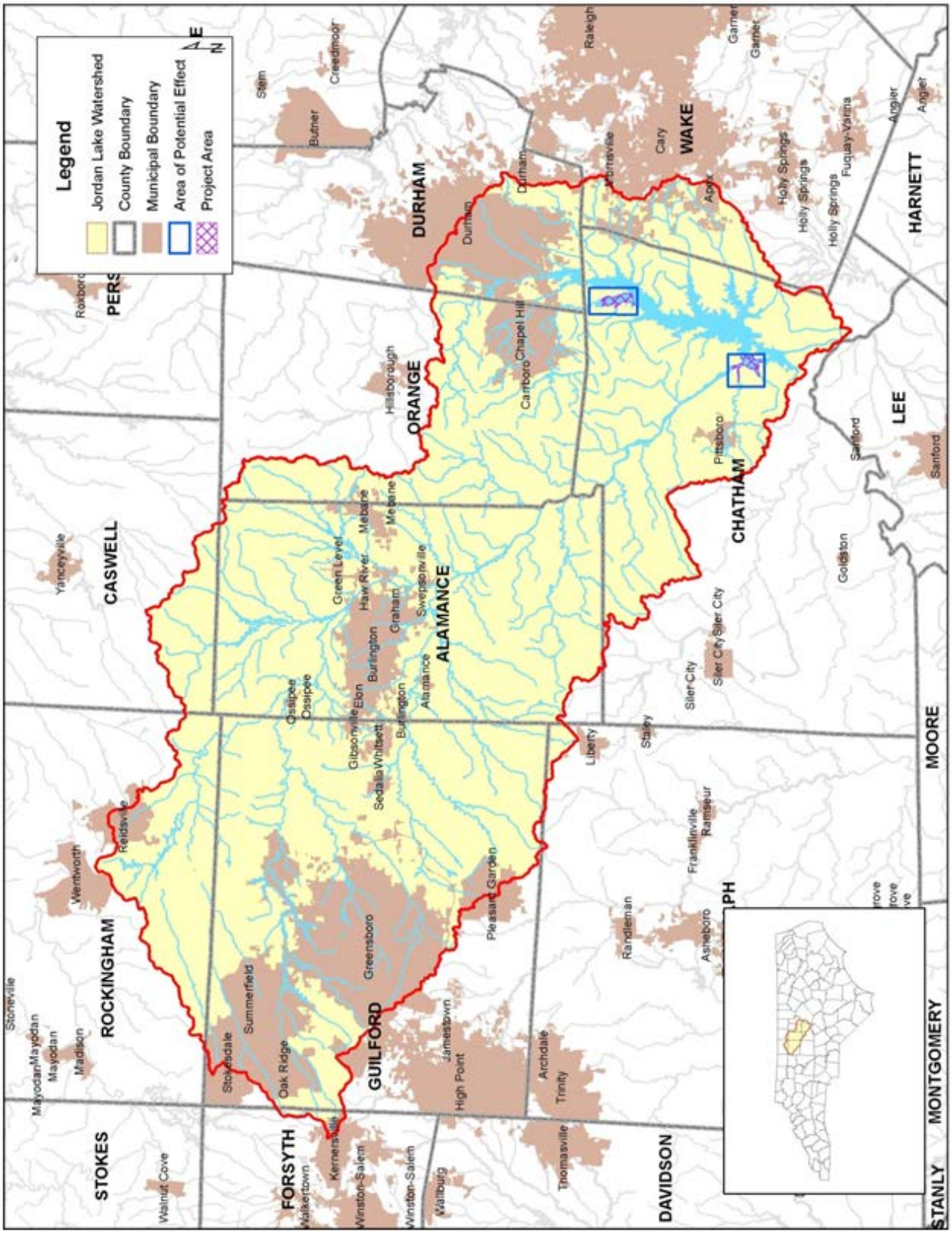


Exhibit 2. Morgan Creek Arm Project Area.

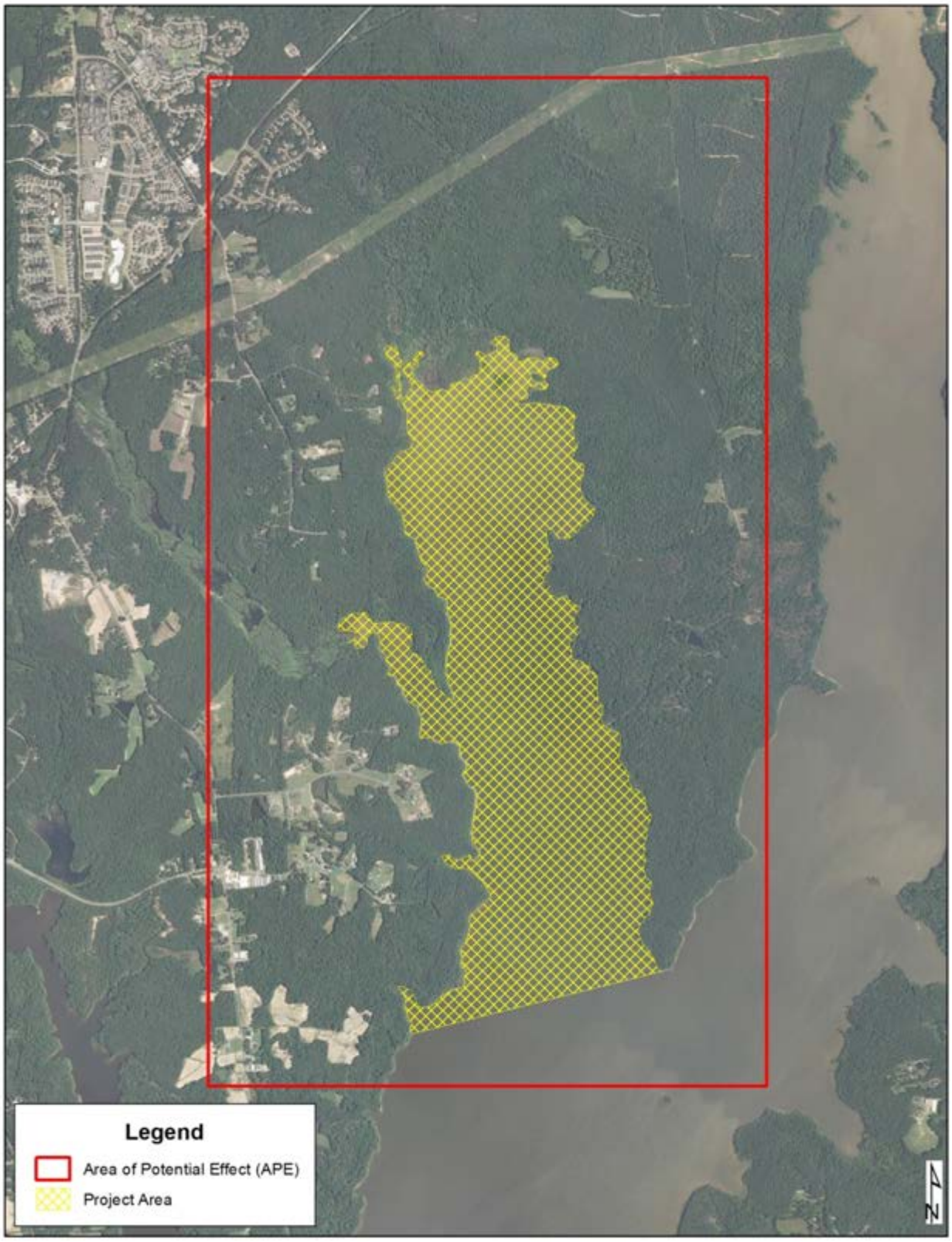


Exhibit 3. Haw River Arm Project Area.

Exhibit 4. Proposed Circulator Locations.

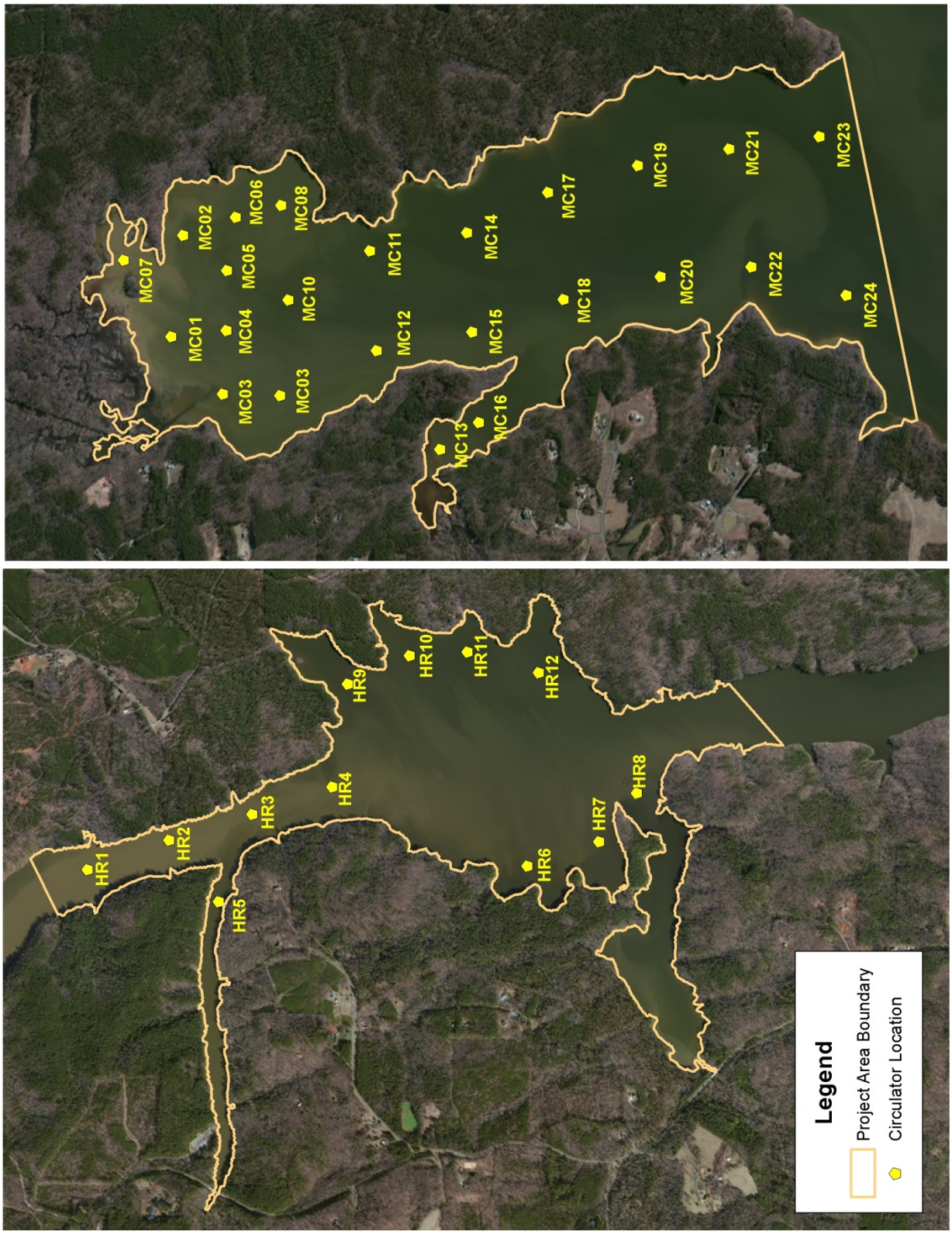
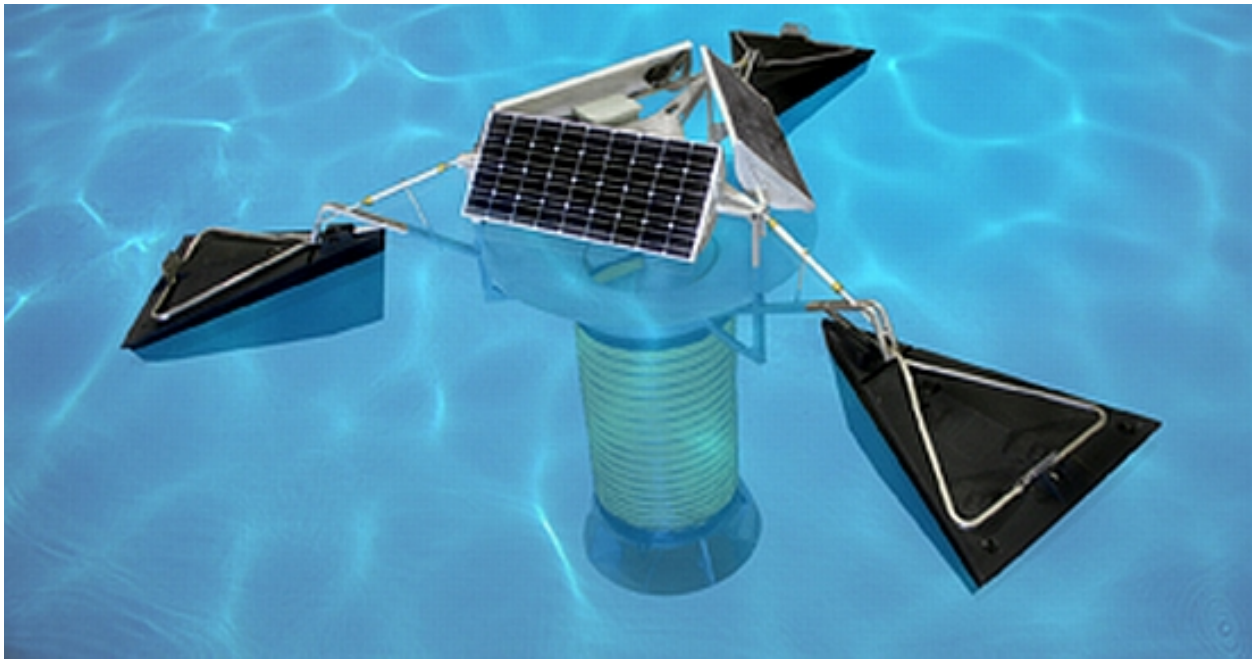
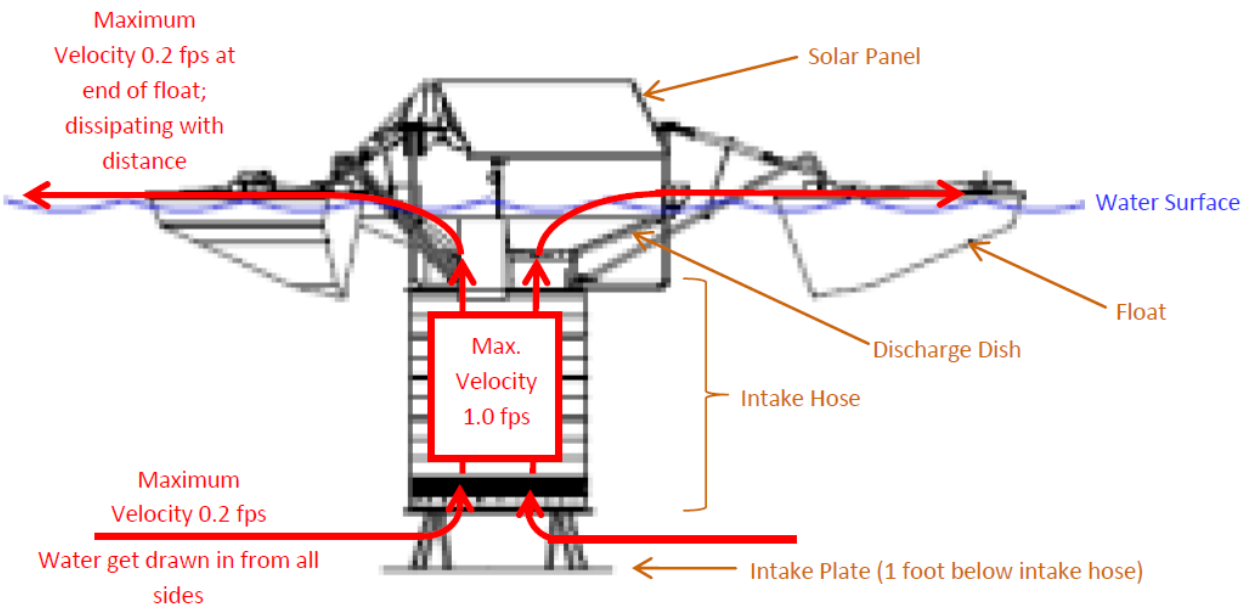


Exhibit 5. Solar Powered In-Lake Long-Distance Circulator.





APPENDIX B
COMMENTS RECEIVED ON EA AND RESPONSES

During the 30-day public review of the EA, comments were received from agencies, communities, groups, businesses, and citizens. Comments and USACE responses are provided in the following sections.

Due to the number and repetitiveness, comments received were categorized into the above categories. Responses are provided by category. An index of commenter and comment category is provided at the end of this Appendix.

Comments Received from Agencies, Communities, Groups, and Businesses during the Public Comment Period

B.1 Aqua Sierra, Inc.

Comment 1: Section 1.0 of the Introduction, states "*The circulators would upwell water from near the bottom of the hypolimnion to the surface (epilimnion) of the lake*."

The depth of the hypolimnion and epilimnion change on a regular basis since they are affected by flow, temperature, weather, precipitation, etc. How will it be verified that the circulators are pulling water from "near the bottom" of the hypolimnion? What will the depth of the intake tubes be at each location? Will the intake depth affect flow rate? How will the seasonal change in depth, especially in the Morgan Creek Arm under drought conditions.

Response 1: The thermocline will be determined at each individual site during deployment. The intake hose will be set accordingly, so specific depths cannot be determined at this time. The circulator manufacturer will have staff in the area throughout the demonstration project which will monitor the lake and make adjustments to the circulator intake hose depth as necessary to keep them above the thermocline.

In the Morgan Creek Arm seasonal changes and releases from Jordan Dam required to meet downstream flow targets under the USACE's water quality mission can cause the area to be depleted of water. In these instances, the circulators would be sitting on the bottom of the lake bed. As discussed in the EA on page 17, the circulators can operate in shallow water and would not be harmed should they operate without water.

Comment 2: Section 1.1.2, The Demonstration Project states "*20 monitoring sites are now located on Jordan Lake. Eleven new stations have been established including four within the Morgan Creek Arm study area and five within the Haw River Arm study area. One new station is located in the New Hope Creek arm. These eleven sites have been established to monitor and determine the effectiveness of this demonstration project and have been monitored monthly since July 2013 in anticipation of the project*."

This is only 8 months of data for 11 of the 20 monitoring sites. It seems very difficult to verify the effectiveness of a potential solution when a full 12 months of seasonal data has not been collected. Ideally multiple years of data would be available in order to accurately attribute effects of the demonstration.

Response 2: Due to the legislation being ratified on July 25, 2013, July 2013 was the earliest that the NCDENR was able to begin the extra monitoring associated with the study.

Comment 3: Section 1.1.2, The Demonstration Project states "*Phytoplankton samples would be collected at selected sites chosen by proximity to circulators. Microscopic analysis would be used to determine species composition*."

At what proximity to the units would these samples be collected? The impact would be much greater the closer you are to the units. The samples should be collected at a specified distance from the circulators; but not in close proximity of the units in order to get an accurate evaluation of treatment area. Also, it is important to evaluate the density of the phytoplankton, not just species composition, which will determine if the population is just present and/or thriving.

Response 3: The NCDENR will be collecting the phytoplankton samples within the influence of the units based on their combined circulation and will establish a set distance for regular sampling. Density and composition will be evaluated for all phytoplankton samples.

Comment 4a: Section 2.0, Purpose and Need for the Proposed Action states "*The biggest water quality concern in Jordan Lake is nutrient loading; specifically relating to nitrogen and phosphorus. These two nutrients have contributed to excessive chlorophyll a concentrations and noxious algal blooms.*"

The source of the nutrient loading, internal and/or external, within Jordan Lake needs to be identified. Re-suspension of phosphorous that has been previously locked to the sediments is a natural occurrence in anoxic conditions. Circulators do not typically keep a high dissolved oxygen level at the sediment/water interface since intake tubes are not at the bottom of a water body allowing for anoxic conditions to persist and phosphorous to become re-suspended.

Response 4a: Nutrient loading is a water quality concern in Jordan Lake; however, according to the State, the purpose of the demonstration project is to deploy in-lake long-distance circulators in Jordan Lake. The project would be considered successful if water quality goals for chlorophyll a, pH, and turbidity are met as they relate to the TMDL. The proposed alternative will not interfere with the sediment/water interface and altering existing dissolved oxygen concentrations is not a defined goal of this demonstration project.

Comment 4b: It is difficult to conceive that any form of local treatment would impact external loading. External loading should be controlled at point source, such as TMDL regulations that are already put in place for Jordan Lake.

Response 4b: This EA addresses the Federal action which is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction is not appropriate in this USACE Wilmington District EA. Reduction of nutrient loading is not a stated project goal and will not be addressed by the preferred alternative.

Comment 5: Section 3.0, Alternatives Considered states "*Due to stipulations outlined in Session Law 2013-360§14.3A.(a), consideration of installation feasibility, and likely product efficacy, solar powered in-lake long-distance circulators have been selected as the preferred action for this demonstration project*."

All available alternatives should be fairly weighed and assessed to provide the shareholders with the best technology to solve the water quality issues in Jordan Lake responsible for noxious algal blooms. The *National Environmental Policy Act of 1969* (NEPA) supports these claims in Sec. 102 [42 USC § 4332] Part B which states that US Public laws shall be interpreted and administered in accordance with the policies set forth in the Act, and Federal Government agencies shall:

> (B) "identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by title II of this Act, which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision making along with economic and technical considerations;" (NEPA, Online).

Response 5: This EA is an adequate NEPA document, and merely addresses the Federal action. The Federal action addressed in this demonstration project is the granting of a USACE real estate license for

the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action is outside of USACE jurisdiction and is not addressed in this EA. Furthermore, certain alternative technologies, such as bottom diffused aeration systems, require additional components such as land-based power sources, or perform functions not desired as part of this demonstration project such as disruption of the thermocline.

Comment 6: Sec. 102 [42 USC § 4332] Part E states Federal Government agencies shall (E) "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources;" (NEPA, Online)

Bottom diffused aeration is a great alternative to the options presented in the EA for Jordan Lake. This type of aeration promotes high concentrations of dissolved oxygen throughout the entire water column allowing phosphorous to be locked to the bottom of a water body and speed up the nitrification cycle reducing the availability of nitrogen. With high levels of oxygen throughout the treatment area, greater fish habitat can be achieved increasing the overall biological carrying capacity of the reservoir. These types of systems do not contain moving parts in the water, do not impact nesting or migratory patterns of waterfowl, and have little to no impact on recreational activity. The equipment for the system is located on shore where maintenance can be performed easily when necessary (typically two to four times per year maximum) and vandalism can be discouraged through the use of concrete buildings and locks. Aqua Sierra can propose a bottom diffused aeration system to be used as an alternative to the in-lake long-distance circulators as completed for the WEARS project previously considered on Jordan Lake.

Response 6: This EA addresses the Federal action, which is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action is outside of USACE jurisdiction and is not addressed in this EA.

Comment 7: Section 3.1, No Action Alternative states "*With the no action alternative, it is likely that water quality concerns in Jordan Lake would gradually improve because the TMDL would remain in place*."

How will the demonstration be able to prove any effects if the "no action" alternative will also improve water quality over time due to reduction in point source and non-point sources of total nitrogen and phosphorus inputs? Biological studies typically only change one variable in order to obtain sound scientific data. When multiple parameters are altered at one time, it is difficult to determine what the effect of each alternative offers.

Response 7: The response time to see desired results from nutrient reduction strategies already put into place, including the TMDL, will be many years and possibly decades. If the demonstration project is successful, then water quality improvements within the project areas could be seen within two years; considerably less time then what would be seen under existing programs alone.

As is discussed in the EA, in addition to sampling sites within the project areas, there are many sampling sites outside of the project areas away from where the circulators will be deployed (Figure 1 in the EA). Various locations within the lake have been sampled since 2009 and will continue to be sampled during the demonstration project. Additional sites within the project areas have been sampled monthly since July 2013. Pre-demonstration project data from the project areas will be used as background data to see if the circulators are having the desired effect. Additional data gathered from outside the project areas will also be assessed to see if any improvements in the project areas and the rest of the lake can be observed.

Comment 8: Section 3.2, Solar Powered In-Lake Long-Distance Circulators states "*Battery failure could affect circulator performance when battery power is required until replaced. Additionally, solar panels may need to be cleaned for optimum performance, especially during periods of little or no rain. However, the units would be inspected for proper operation and any necessary maintenance performed on a routine basis (at least weekly). It would be possible to clean solar panels at that time as required*."

The batteries in solar powered systems retain energy for them to operate; therefore, battery failure will indeed affect circulator performance. Also maintenance on an "at least weekly" routine basis seems very intensive and costly. What entity is responsible for this maintenance? What are the associated costs? How will battery failure be detected? How will pumping capacity be affected over time as the pump motors age? Do they require regular maintenance or rebuilds to maintain defined function? How will the change in treatment overtime be handled?

What is the storage capacity of the solar battery units? What is the impact of cloudy, rainy days which are inherent in this part of the world year around? How will treatment be impacted if the units are unable to function for extended period of times?

Response 8: As described in the EA, "the units would be inspected for proper operation and any necessary maintenance performed on a routine basis (at least weekly)" for the 24-month demonstration project duration. The Legislature has set aside funds for project inspections, which will be performed by NCWRC. Additionally, the lease agreement with the manufacturer will include a maintenance agreement. There will be no cost to the State for physical maintenance, should any be required. Circulators will be newly manufactured and contain all new components. Circulators have a 2 year warranty, a 25-year design life, and typically need very little maintenance. The battery is mounted underwater to extend the battery life. Battery condition can be determined at any time by opening the control box and observing the LED self-diagnostics in the box. The manufacturer's experience indicates that the average battery life is 8 years, with the machine operating over 95% of the time at full speed, nonstop.

In prolonged dark conditions the circulator function will slow down or even stop (for example if the solar panels were covered with a tarp for 2 weeks) as needed to protect the battery from permanent damage. Continuous dark conditions of this duration are unlikely and unexpected. In-lake conditions are generally not affected by any temporary and short lived changes in circulator function due to prolonged solar obstruction.

Comment 9a: Section 3.2, Solar Powered In-Lake Long-Distance Circulators states "*In order to meet the objectives of the demonstration project, a total of 24 circulators would be placed in the Morgan Creek Arm. Circulators placed in the northern portion of the Morgan Creek Arm would need to operate in shallow water. The deepest part of the Morgan Creek project area is near the mouth, where the depth is approximately 10-12 feet and becomes progressively shallower moving upstream, with no apparent channels (Triangle J Council of Governments, 2013). The Haw River Arm is deeper, and does have a more defined channel. The deepest parts are near the mouth where depths are about 45 feet deep and are about 35 feet deep in the upper part of the project area*."

How will the differences in depth account for the units upwelling "water from near the bottom of the hypolimnion" as stated in section 1.0?

Response 9a: The two statements are in conflict and one is an error in the EA. Section 1.0 has been corrected to reflect that water will be circulated from near the bottom of the epilimnion to the surface. As is indicated in several areas of the EA, water will be circulated from above the thermocline. Water will not be circulated from the hypolimnion, should it be present.

Comment 9b: Section 3.2, Solar Powered In-Lake Long-Distance Circulators states "*The upper (northern) part of Morgan Creek is shallow and may dry up under extreme drought conditions. As a result, circulators placed in the upper parts of Morgan Creek Arm would be configured to operate in shallow water and not suffer failure if operated out of water. Circulators can operate in as little as three feet of water, and would completely stop circulating water at approximately two-foot depth*."

What happens if these areas dry up and the units are then isolated? If the motors are not impacted by running dry, what about the propeller not being able to turn because it is stuck in the mud? What happens to the intake tube if the water below the unit disappears?

Response 9b: As can be seen in Figure 28 of the EA, the circulators are equipped with a protective intake plate attached to the bottom of the intake hose. Should the water level significantly drop in project areas, the plate, and potentially floats, would rest on the bottom of the lake. The plate and intake hose would prevent the impeller from contacting the ground directly.

Comment 10a: Section 3.2, Proposed Action - Demonstration of Solar Powered In-Lake Long- Distance Circulators states "*The State of North Carolina is proposing a demonstration project which includes the installation of 36 solar powered in-lake long-distance circulators in portions of Jordan Lake. These circulators are capable of a direct flow rate of up to 3,000 gallons per minute (gpm) (401 ft^3 per minute) with an induced flow rate of 10,000 GPM (1,337 ft3 per minute)*"

The proposed action states an "up to" volume for treatment. What impacts the direct flow rate? The Medora website does not specify a unit that has a flow rate of up to 3000 gpm. The SB2500 specifications indicate flow rate of 2,500 gpm whereas the SB500 indicates a flow rate of 5000 gpm. Are these units special order or made specifically for this application? Is there additional information that supports the calculations for the flow rate presented?

Response 10a: Direct flow is the flow up the intake hose and through the impeller. Direct flow is impacted by impeller speed, impeller diameter, impeller pitch, and friction losses. When the direct flow leaves the impeller and is outwardly dispersed in a 360 degree pattern, it upwells, through friction (drag) additional water from around the circulator, but outside of the hose. This is referred to as induced flow. The SB10000v18 machines that will be used in Jordan Lake are standard basic machines. The flow rate is 3,000 gpm in the circulator hose, with induced flow rate being 10,000 gpm.

Comment 10b: Session Law 2013-360§14.3A.(a) states "At a minimum, the in-lake mechanical system chosen must meet the following criteria:

(1) Floating equipment shall be capable of continuous operation on solar power only during day, night, and extended overcast conditions 365 days per year. Continuous operation shall be defined as operating a minimum of ninety-seven percent (97%) of the total hours during the course of one year on solar power without reliance on any connection to the alternating current power grid.

(2) Achieve a total flow rate through the impellers on a continuous basis for 24 hours per day of 72,000 gallons per minute in the Morgan Creek arm and 36,000 gallons per minute in the Haw River arm."

The pumping rate should be verified based off the size of the proposed motors, diameter of propeller and specified pumping rates of the units to be utilized in the demonstration. The capacity of the batteries

should be verified to ensure that the units are capable of 97% operation in extended periods of clouds, rain or fog. If the units are only capable of pumping 2,500 gpm each this would not meet the minimum criteria stated in Section 2013-360§14.3A.(a). Since specifications are not provided for the proposed 3000gpm unit, this could not be confirmed for this demonstration project.

Response 10b: Circulators selected by the State of North Carolina as the preferred alternative (SB10000v18 model, manufactured by the Medora Corporation) were selected based on manufacturer specifications and will satisfy the criteria of Session Law 2013-360§14.3A.(a).

Comment 12: Section 3.2, Proposed Action - Demonstration of Solar Powered In-Lake Long- Distance Circulators states "*One potential concern with upwelling water from depth is the potential for anoxic water to be brought to the surface potentially reducing dissolved oxygen at the surface. There is a possibility that anoxic conditions could be present, especially in deeper areas of Jordan Lake. However, as previously mentioned, the water would be drawn up from above the thermocline, where dissolved oxygen levels are relatively higher than those below the thermocline. Therefore, it is not likely that anoxic water would be brought to the surface from deeper areas, as this water is typically present below the thermocline. There is a possibility that hypoxic or anoxic conditions may periodically exist; however, any decrease in dissolved oxygen levels at the surface are expected to be relatively short lived, lasting no more than a few days*."

In the introduction it was stated that the water would be pumped from "near the bottom of the hypolimnion"; however, here it states that "the water would be drawn up from above the thermocline". This is a conflicting statement. If the water is pumped from near the bottom of the hypolimnion, it will likely be anoxic. The depth of the intake tubes at each location will likely impact the quality of the water being brought to the surface.

Response 11: The two statements are in conflict and one is an error in the EA. Section 1.0 has been corrected to reflect that water will be circulated from near the bottom of the epilimnion to the surface. As is indicated in several areas of the EA, water will be circulated from above the thermocline. Water will not be circulated from the hypolimnion, should it be present.

Comment 12: Section 5.1.6, Water Quality states "*According to the State, implementation of circulators in the Morgan Creek Arm and Haw River Arms is expected to improve water quality by enhancing nutrient management strategies already in place. These strategies include the* B. Everett Jordan Reservoir, North Carolina Phase I Total Maximum Daily Load (TMDL) *allocations which require reductions from both point and non-point sources of nutrients, the Jordan Lake Buffer Rules which require riparian zones in the watershed to be protected, stringent storm water collection and treatment requirements, and Unified Development Ordinance regulations in more developed areas and portions of the JLNMS. The circulators are expected to improve water quality by decreasing chlorophyll a concentrations, reducing turbidity, and lowering pH*."

Again, how will the demonstration be able to prove any direct effects since the TMDL regulations are already in place and having a positive effect on reductions in nutrient inputs?

Response 12: The effects of circulators on chlorophyll a, turbidity, and pH would be evident and quantifiable over a 24-month time period, as compared to no action conditions, should the demonstration project be successful.

Comment 13: Section 5.1.11, Aesthetics states "*A buoy or marker would be used to mark the anchor point and give warning about the circulator. These would be a highly visible color such as white or bright*

orange and be able to be seen from shore or from an appropriate distance away. Other safety features would include Coast Guard approved lighting, and/or reflective tape or bands, and/or highly visible signage and strobe lights for nighttime visibility. The circulators would visually affect aesthetics in a manner similar to that of a channel marker (Figure 25). Circulators and accompanying markers would present a small visual impact from shore or boat, but would not significantly impact aesthetic resources.

The proposed action would affect the aesthetics of the project areas. Aesthetics would be impacted as the circulators would be seen floating on the water surface. However, the low profile of the circulators would make it difficult for them to be seen at a distance. Associated markers and signage may be visible as well. The no action alternative will not affect aesthetic resources."

It is stated that the units will be "marked with a highly visible color which would be able to be seen from shore or appropriate distance away" and then in the next paragraph it states that "the low profile of the circulators would make it difficult for them to be seen at a distance." This is also a very contradictory statement. How can the units be well marked with a highly visible color but difficult to see at a distance? The current view is of an unobstructed water body that will now be littered with many 16" [*sic*] diameter floating objects with highly visible color and flashing strobe lights. Objects impeding the unobstructed view will be a significant impact to the aesthetics of the resource.

Response 13: The connotation of the phrase "seen at a distance", as it is used in this EA, describes an expanse of space beyond that of "appropriate distance away". "Appropriate distance away" relates to distances applicable to boater safety and navigation visibility within project areas.

Comment 14a: Section 5.3.2 Fish and Wildlife states "*Many waterfowl frequent Jordan Lake and may rest, forage, or nest in or near the Lake. These activities would be precluded in the immediate vicinity of circulators. The velocity of water at the circulator head would be about 0.2 feet-per-second, which may be too turbulent for waterfowl to rest and possibly paddle in. However, the velocity of the water leaving the circulator head dissipates with distance. Swimming and foraging should be able to occur within a short distance of the circulator. Wading birds would be less impacted. None of the circulators would be placed very close (greater than 100 feet) to shore (Figure 9) and all would be located in water at least five feet deep, which is too deep for wading birds. It is anticipated that wading birds would be unaffected by circulators in shallower waters of the project areas. The circulators would be outfitted with bird deterrent devices to keep birds from resting or roosting on them.*

Neither the proposed action nor the no action alternative would have an effect on waterfowl."

The velocity of water at the circulator head may be too turbulent for waterfowl and could result in injury or death if a bird entered this area. It is also possible that the flashing strobe lights will have an impact to bird populations. Currently there are many units on the market that utilize strobe light technology to deter bird populations from aquatic resources. One product, *Away with Geese* claims that a 360° degree flashing strobe is an effective way to drive geese away by disrupting sleep patterns causing them to relocate. *Deta et al*, states that light pollution can impact animal navigation, alter competitive or predator-prey interactions and affect animal physiology. Based on this, these types of lights could affect migratory bird navigation, eagle feeding activities over the water, vertical migration of zooplankton, and fish behavior.

Response 14a: Table 8 in the EA shows water velocities versus distance from the circulator hose intake; water velocities leaving the circulator are similar. The velocity of the water leaving the circulator head is 0.2 fps. By the time the water reaches the end of the float (eight feet) the velocity has decreased to 0.13 fps, and velocities continue to decrease quickly with distance. Water is not being drawn down from the surface near the circulator head and would not be much different than landing in the in water with a

very mild current. Should waterfowl land near the circulator they would be gently pushed away from the circulator, not pulled under water or harmed.

According to the "2013 U.S. Fish and Wildlife Service (USFWS) Revised Voluntary Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning," the preferred type of light, for tall structures that must be lit, is a flashing white or red light. With respect to towers, antennas, and other tall structures, recent studies show that the use of white strobe, red strobe, or red flashing lights will provide significant reductions in bird fatalities. The strobes used on the circulators will be white. It is not anticipated that the white flashing strobe lights used on the circulators will have a significant impact on migratory birds and are the recommended type to be used by the USFWS.

Comment 14b: While species more accustomed to humans and manmade structure (i.e. Seagulls and Double-Crested Cormorants) may show less intimidation, more sensitive waterfowl and bird species may avoid stages, feeding, and congregating in the vicinity of the floating circulators. Seagulls and cormorants on the other hand will likely use the platforms and towers as a perch. Cormorants lack the protective oil coats on their skin common to other water birds and require a perch on which to stretch their wings and dry themselves. Where these species congregate and perch, they also defecate. Due to the prevalence of these species on and around Jordan Lake and the perceived safety from predation provided by the floating platform, it can be reasonably expected the WEARS system will act as a perch and catch the birds' defecation. Bird feces are primarily comprised of highly corrosive uric acid, which will ultimately breakdown and compromise any surface, equipment, or machinery upon which it sits.

Response 14b: The commenter incorrectly identifies the ResMixTM System, manufactured by WEARS Australia, as the preferred alternative; however, comment meaning is understood. The circulators will have a bird guard installed to discourage nesting and roosting on solar panels. The manufacturer states that the floats will not be damaged by bird defecation, especially considering the relatively short project duration of 24 months. Additionally, the lease agreement will include a maintenance agreement. Should performance of circulator integrity be compromised for any reason, including bird defecation, the manufacturer would be responsible for repair.

Comment 15: Section 5.3.2.3 Fisheries states "*The fate of juvenile and smaller fish in regards to the circulator intake and impeller is another concern. The NCWRC has suggested that a one millimeter mesh intake screen be installed to prevent fishes from contacting the impeller*."

A one millimeter mesh screen will require significant additional maintenance and will ultimately affect performance of the units. Any organic or inorganic material in the water column (i.e. algae, plants, zooplankton, fish, debris, etc.) will get sucked into this mesh restricting water flow up the draft tube of the circulator unit. This screen will likely need to be cleaned or replaced on a regular basis resulting in possibly reduced efficacy of the units and intense, regular maintenance.

Response 15: The use of screens on the circulators is addressed in section 5.3.2.3. Screens are not necessary.

Comment 16: Section 5.3.3 Endangered and Threatened Species states "*Bald eagles are a common sight on Jordan Lake, and watching them is a popular recreational activity. It is reported that Jordan Lake is home to the largest population of bald eagles on the east coast (NCDPR). The NCNHP has records of nesting bald eagles near the Morgan Creek Arm project area since 2011 (Weakley, 2013). The project would not affect bald eagle nests and would have no direct physical impacts on bald eagles. One of the primary sources of food for bald eagles is fish, which are abundant in waters of Jordan Lake. The circulators are not anticipated to have a negative effect on fish populations. It is quite possible that circulating water may have a positive impact on fish populations, as more desirable and edible algae*

would be available as food, turbidity is expected to decrease, and water could have higher dissolved oxygen levels. An increase in fish populations could be a benefit to bald eagles. The impacts of the project on fish populations are discussed further in Section 5.3.2.3. The proposed action would not affect bald eagle populations."

Could these floating units deter the eagles from wanting to fish in the areas where they are located? The multiple units could affect navigation on the water where eagles would potentially fish.

Response 16: The USFWS was provided a copy of the EA for review and comment. In their comments, they state "In accordance with the Endangered Species Act of 1973, as amended, (ESA) and based on the information provided, and other available information, it appears the action is not likely to adversely affect federally listed species or their critical habitat as defined by the ESA. We believe that the requirements of Section 7(a)2 of the ESA have been satisfied for this project."

Comment 17: Section 5.3.3 Recreation states "*The circulators would have a minimal impact on fishing. While boaters would be able to approach the circulators to fish, anchoring within 100 feet of the circulator would be discouraged as to not entangle the tether line*."

"*The proposed action would have minimal impacts on recreational opportunities*."

"*Although boaters may be inconvenienced by having to navigate around circulators and by not being able to anchor in the immediate vicinity of the circulators, adequate space would be available for navigation and anchoring in the project areas while maintaining a safe distance from circulators. Circulators would be properly marked to alert boaters of their location, during all types of light conditions (day and night). The proposed action represents a small adverse impact to recreation in the project areas*."

The reduction of water use within 100 feet of each of the solar circulators would have a significant impact to the available water area utilized for recreational activities, such as fishing and swimming, as well as limits the navigable water to boats for transportation. Calculations indicate that this would be a total reduction of approximately 753,600sf in the Morgan Creek Arm and approximately 376,800sf in the Haw Creek Arm based on the number of proposed units. Will boaters consider the reduction in available area for fishing and being "inconvenienced by having to navigate around circulators" a "minimal [impact] to recreational opportunities"?

Response 17: As discussed in section 5.4.3 of the EA, the 100 foot limitation will only apply to anchoring. Boaters will not be prohibited from approaching the circulators. The anchoring restriction is intended to help prevent anchors from getting tangled in the mooring line of the circulator.

Comment 18: Section 5.4.6 Safety states "*A safety concern with the proposed action, deployment of circulators in Jordan Lake, is that they may pose a navigational safety hazard to boaters.*"

"*The circulators would pose a safety risk*."

The proximity of the solar circulators to each other, the alcohol policies involving boating in the state of North Carolina, and the permissibility of minors to operate both mechanized and non-mechanized watercraft makes the presence of the floating solar circulators on the water a significant legal liability to Jordan Lake shareholders. Jordan Lake is an active recreational resource in close proximity to multiple population centers. The proposed floating solar circulator systems with protective buoys, strobe lights, solar panels, bird deterrents, will attract attention. Be it boater traffic commuting across the lake,

fishermen or swimmers, the solar circulator units will plausibly act both as an impediment to recreational traffic and an attractive oddity to explore.

The floating solar circulating units would act as an "attractive nuisance" and could leave the shareholders susceptible to litigation and legal liability in the case of an associated accident especially if involving a minor. *The Doctrine of Attractive Nuisance* states that the landowner is liable for leaving a condition or object on their property that attracts and then injures a minor. Regardless of the unspecified measure that would be taken to ensure boater safety, these units would remain an attractive nuisance to minors, the public would be susceptible to harm, and the shareholders left vulnerable to litigation and legal liability in the case of injury or death.

Response 18: The "attractive nuisance" doctrine pertains to activities that occur on land, and does not apply to navigable waters of the project areas. Just as it is the responsibility of boat operators to avoid striking a navigational buoy, mooring buoy, safety sign, another boat, or any other object while under way, it will be the responsibility of the boat operator to avoid striking the circulators, no matter what the time of day. The circulators will be equipped with strobe lights similar to those found on other navigational aids. Should a boat operator be traveling at a higher rate of speed than the situation allows, the boat is not being operated in a safe manner and the operator is liable.

Comment 19: Section 5.4.6 Environmental Impact Comparison of Alternatives states "*A comparison of impacts for solar powered in-lake long-distance circulators (proposed action) and the no action alternative are presented below. No other alternatives other than in-lake long-distance circulators have been carried forward for further consideration, as they would not meet the stipulations of Session Law 2013-360§14.3A.(a). Various types of in-lake long-distance circulators, including solar powered, AC powered, and wind powered were considered and discussed in Section 3.0. All alternatives except for the no action alternative and solar powered in-lake long-distance circulators were dismissed as alternatives for various reasons and are therefore not included*."

Since this EA does not consider other alternatives, it appears to be in conflict with the NEPA Act of 1969.

Response 19: The statement "*All alternatives except for the no action alternative and solar powered in-lake long-distance circulators were dismissed as alternatives for various reasons and are therefore not included*" is meant to explain that non-preferred alternatives considered in section 3.0 of the EA will not be carried forward for further analysis because they would not adequately satisfy the requirements of the demonstration project. This EA is an adequate NEPA document, and addresses the Federal action.

Comment 20: Section 6.5 Executive Order 13186 (Protection of Migratory Birds) states "*Neither the proposed action nor the no action alternative would have a significant impact on migratory birds*."

The potential impact to migratory birds by the flashing strobe lights on the units needs to be considered.

Response 20: According to the "*2013 U.S. Fish and Wildlife Service (USFWS) Revised Voluntary Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning,*" the preferred type of light, for tall structures that must be lit, is a flashing white or red light. The strobe lights used on the circulators will be white. It is not anticipated that the white flashing strobe lights used on the circulators will have a significant impact on migratory birds.

Comment 21: Section 13.0 Finding of this Environmental Assessment states "*The proposed action would not significantly impact the quality of the human environment: therefore an Environmental Impact*

Statement would not be required. If this opinion is upheld following circulation and review of this EA, a Finding of No Significant Impacts (FONSI) would be signed and circulated."

We do not agree that this proposed action will not significantly impact the quality of the human environment. We propose that an Environmental Impact Statement be provided prior to the demonstration project. As previously stated the potential for harm is apparent and should be considered to limit liability and litigation of the Jordan Lake shareholders.

Response 21: Disagree. The proposed action would not significantly impact the quality of the human environment: therefore an Environmental Impact Statement would not be required.

Comment 22: Appendix A (Scoping Comments Received) contains a letter from NCWRC regarding request for an alternatives analysis including bottom diffused aeration. The letter states "*We are concerned about direct impacts of the aeration system on aquatic resources and recreational boating. The EA should include an alternatives analysis that evaluates other alternatives (e.g. bottom diffuser) to the proposed surface aeration system…*"

This specific concern was not addressed in the EA. There are also other concerns that were listed in the letter that were neglected and should be addressed.

Response 22: The NCWRC was provided a copy of the EA and in turn submitted comments. The NCWRC states that "[I]n the scoping comments the Commission requested specific information regarding aquatic habitat and fisheries, as well as boating traffic and safety be included in the environmental assessment (EA). The EA is comprehensive and thoroughly addresses many of the Commission's initial concerns regarding the demonstration project."

B.2 General Environmental Systems, Inc.

Comment 1: It is stated in the EA that DO is not really an issue and that readings are generally above the minimum limit of 5 mg/l, yet it is mentioned that it is possibly anoxic in the lower hypolimnion. Therefore I am not sure at what depth the DO readings are taken as shown in the charts. The fact that the EA states that the solar units will be adjusted such that they are avoiding circulation of any anoxic water at the bottom of the hypolimnion doesn't sound like a good practice at all.

Over the years we have found that the goal for shallower lakes, such as Lake Jordan, should be to destratify the water column starting as close to the bottom as possible but not close enough to stir up the sediment. That way, we are not avoiding any anoxic water at the bottom. Leaving anoxic water is a risk and when ambient temperatures drop in the Fall, that anoxic water can get mixed all of a sudden and cause obvious issues that can last several days to clear up. It is better to have a system that destratifies the entire water column from the beginning (installed and started-up well prior to summertime) and then keeps it destratitied/mixed throughout the warmer season. To purposefully leave the water stratified/anoxic below the thermocline as a normal mixing practice in the climate we live in will cause problems at some point. We do not advise that.

Response 1: The Federal action addressed in this EA is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction and not appropriate for this USACE Wilmington District EA. Additionally, destratification is not a goal of this demonstration project.

Comment 2: According to the EA, there seems to be a lot of safety hazards with floating units, caused by the units themselves being on top of the water, not very visible from a distance by approaching boaters, having many tethers that in many cases cause a fairly large area that boaters can't approach, many buoys, lighting on the units that could go out, the possibility high water levels and waves can displace the units from their intended positions, etc. A bottom diffuser type aeration/mixer system doesn't have any of those issues. [With a bottom diffuser type aerator/mixer system, you] see nothing but regularly spaced small plumes / ripples on the surface of the water (if not windy) that are caused by the air diffusers that are located near the bottom. Nothing that has to be protected by buoys, signs, strobe lights, etc.

Response 2: Safety and circulator marking is addressed in section 5.4.6 of the EA. A bottom diffuser type aeration/mixer system would not best meet demonstration project requirements.

Comment 3a: The EA states that "the units would be inspected for proper operation and any necessary maintenance performed on a routine basis (at least weekly)." That is a lot of labor and time (i.e. maintenance expense) involved, not only for the initial 36 units, but if it is decided to go ahead and install the 155 or so units that were mentioned in the News & Observer at the end of the 2 year demonstration period, that would really be a lot of maintenance/operating expense. The lake certainly would look like a Christmas tree from the sky, with all the safety lights on that many units glowing. Those as well would have to be maintained.

Response 3a: As described in the EA, "the units would be inspected for proper operation and any necessary maintenance performed on a routine basis (at least weekly)." The Legislature has set aside funds for project inspections. Additionally, the lease agreement with the manufacturer will include a maintenance agreement. There will be no additional cost to the State for physical maintenance, should any be required.

Comment 3b: I would hope that the revenue from the high attendance (970,000 people in 2010 per the EA) to the lake that is cited in the EA would remain as high given the decreased navigability of the lake with that many or more floating units installed in the future. If not, the decreased tourist revenue should be taken into consideration in this decision.

Response 3b: It is not anticipated that attendance would decrease due to implementation of the demonstration project.

Comment 4: The EA states: "With the exception of Robeson Creek, the circulators would not be placed in the main channel; should one exist. The circulators would present a navigational impediment similar to that of floating markers which already exist in some areas of Jordan Lake." This is not the proper method to aerate a body of water. Systems installed at the surface impede boat navigation.

Response 4: Comment noted. Safety is discussed in section 5.4 6 of the EA. Additionally, aeration is not a project goal.

Comment 5a: Given that the DO data seems to be acceptable (again, it isn't explained what the DO levels are throughout the water column), the value of the chosen solution would most likely be the decrease in blue algae and increased DO levels. I am just not sure the chrolophyll [*sic*] levels will be improved with the chosen units.

Response 5a: Concerning the effects of circulator function, and specifically the suppression of algal blooms, increasing flow rate has been shown to suppress algal blooms in nutrient-rich environments (Hudnell et al., 2010).

Hudnell, K. H., Christopher, J., Bo, L., Vic, L., Dennis, H. R., & Joseph, E. (2010). Freshwater harmful algal bloom (FHAB) suppression with solar powered. *Harmful Algae, 9*, 208-217.

Comment 5b: The fear I have is that not only is the "demonstration project" very, very costly, it is possible it could not only be decided to not remove the 36 demonstration units at the end of the two year period, but the installation could be expanded to at least 155 units per the articles in the News & Observer. The EA acknowledges that by taking the alternative "no action", the conditions in the lake should improve anyway. I have no doubt that some improvement would be made with the demonstration project in the area of the installation.

Response 5b: Comment noted. Demonstration project duration will not exceed 24 months.

Comment 5c: The trouble is that Jordan Lake is very large and these two installations would most likely only improve those specific areas as stated in the EA. The only way to improve a larger portion of the lake would be to add many more units as they could possibly do if the demonstration was considered successful, rightfully or not, due to the chosen solution. The thing we need to keep in mind is do we really want as many things floating on the lake as what it would take to do the job beyond the size of the demonstration project?

Response 5c: This EA addresses the Federal action, which is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. Any potential future action is not addressed in this EA.

Comment 6: Our vote would be to take the "No Action" alternative at this point given the two alternatives and take a chance on seeing how well things improve without using the chosen solution, given the many issues I feel the chosen solutions has. The EA states: "*With the no action alternative, it is likely that water quality concerns in Jordan Lake would gradually improve because the TMDL would remain in place*." And that "*Water quality is expected to improve under the no action alternative, although it is difficult to determine how long it may take to reach water quality goals*."

Response 6: Comment noted. The project purpose is to demonstrate if deployment of in-lake long-distance circulators can reduce chlorophyll *a* concentrations in Jordan Lake. It is anticipated that the demonstration project will reduce the amount of time necessary to reach water quality goals under the no action alternative.

Comment 7a: The most obvious observation after reading the EA as well as the many articles in the News & Observer over the past several months is that somehow, without competitive bidding nor discussions with vendors of alternative aeration / mixer systems, a decision was made to narrow the solution to not only just a few floating solutions, but even a specific one.

As the EA states, "Due to stipulations outlined in Session Law 2013-360§14.3A.(a), consideration of installation feasibility, and likely product efficacy, solar powered in-lake long-distance circulators have been selected as the preferred action for this demonstration project.".

Response 7a: The EA compares multiple long distance circulator alternatives. Based on published

specifications, the preferred alternative is best suited for use in this demonstration project and will allow for the installation of as few circulators as possible as compared to other alternatives. Additionally, due to technical and operational differences among alternatives considered, the NCDENR felt it best to state a specific manufacturer so details of operation, maintenance, deployment could be discussed, as these items are different among circulator manufacturers.

Comment 7b: In the EA, a MEMORANDUM dated 16 September 2013 from Shari L. Bryant, North Carolina Wildlife Resources Commission Piedmont Region Coordinator, Habitat Conservation Program, with Subject: "Scoping for Mechanical Aeration System for the Management of Nutrients in Jordan Lake, Chatham County. DENR Project No. 14-0069", Shari states: "We are concerned about direct impacts of the aeration system on aquatic resources and recreational boating. The EA should include an alternatives analysis that evaluates other alternatives (e.g., bottom diffuser) to the proposed surface aeration system, and includes a discussion of environmental impacts from construction, operation, and maintenance of the proposed aeration system as well as the other alternatives."

No evidence is shown in the EA that Shari's request to have bottom diffuser type systems evaluated has taken place. Shari is right on target with her ignored request. Bottom diffuser type systems overcome many of the negative issues that the chosen solution has.

Response 7b: The NCWRC was provided a copy of the EA and in turn submitted comments. The NCWRC states that "[I]n the scoping comments the Commission requested specific information regarding aquatic habitat and fisheries, as well as boating traffic and safety be included in the environmental assessment (EA). The EA is comprehensive and thoroughly addresses many of the Commission's initial concerns regarding the demonstration project."

Comment 8: The EA states: "The Jordan Lake Reservoir has historically been one of the most eutrophic reservoirs in North Carolina (NCDENR, 2007)."

Response 8: Comment noted.

B.3 Haw River Assembly

Comment 1: The Solar Bees have a low profile on the water. Even if the mixers have lights, it will be easy for someone traveling fast to crash into them and be injured. I urge you to imagine the scenario during summer weekends – and especially holidays - when there are practically traffic jams at the lake with power boats, water skiers, jet skis, small fishing crafts, sailboats and paddlers out in force, even after dark. These hazards have not been adequately addressed in the EA, nor has the amout [*sic*] of boating traffic been described. We are equally concerned that SolarBees placed in the fast-moving waters of the Haw River arm, even back in coves, could be damaged or unmoored during floods, creating additional hazards (and new trash form of trash to be cleaned up from the lake). Have Solar Bees ever been used in the kind of conditions we find on the Haw River arm of Jordan Lake?

Response 1: Safety is addressed in section 5.4.6 of the EA. Just as it is the responsibility of boat operator to avoid striking a navigational buoy, mooring buoy, safety sign, another boat, or any other object while under way, it will be the responsibility of the boat operator to avoid striking the circulators, no matter what the time of day. The circulators will be equipped with strobe lights similar to those found on other navigational aids. Should a boat operator be traveling at a higher rate of speed than the situation allows, the boat is not being operated in a safe manner and the operator is liable. Regarding potential flooding in the Haw River, the circulators are not expected to break loose from their moorings during floods. According to the manufacturer, the proposed circulators have been deployed in reservoirs that have risen

over 20 feet in one day without incident, and many machines have survived hurricanes.

Comment 2: The North Carolina Wildlife Resources Commission ("WRC") recommended that "intake structures have passive screens with openings not to exceed one centimeter and with a maximum intake velocity of 0.5 feet/sec to minimize impingement and/or entrainment of fish." This call for a screen to keep fish from entering the circulators was rejected, stating a screen would reduce the efficiency of the circulators, and that small fish could pass through unharmed The EA does not give the kind of information needed to support these claims.

Response 2: The use of screens on the circulators is addressed in section 5.3.2.3. Screens are not necessary.

Comment 3: Jordan Lake is owned by the federal government and operated by the U.S. Army Corps of Engineers, and this request to put SolarBees in Jordan Lake requires your consent. We do not believe that you should permit NC DENR to allow the construction of anchors on the lake floor and placement of these SolarBees. We do not believe this EA provides sufficient justification to proceed with approval for installing SolarBees at Jordan Lake as demanded under the National Environmental Policy Act.

Response 3: This EA is an adequate NEPA document, and addresses the Federal action. The Federal action addressed in this demonstration project is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action is outside of USACE jurisdiction and is not addressed in this EA.

Comment 4: The EA does not adequately describe the need nor the actual source of the nutrient pollution in Jordan Lake, nor does it adequately consider direct, indirect, or cumulative impacts of these SolarBees. Rather, the purpose of the "experiment" appears to be whether North Carolina can reduce chlorophyll a sufficiently to continue delaying implementation of the Jordan Lake Rules. But the Rules were never meant to reduce the symptom of pollution (algae growth) but the cause of it (nutrient pollution).

Response 4: The purpose and need for this demonstration project are accurate and clearly stated. Reduction of nutrient loading is not a stated project goal and will not be addressed by the preferred alternative. This EA is an adequate NEPA document, and addresses the Federal action. The Federal action addressed is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction and is not appropriate for this USACE Wilmington District EA.

Comment 5: The EA does not consider any alternatives to reducing algae growth in Jordan Lake other than "in-lake" circulation technologies. Why does it not state the obvious true alternative - the Jordan Lake Rules to reduce the source of nutrient pollution that feeds the algae? This experiment" using a large number of identical and potentially hazardous aerators at Jordan Lake would not in my opinion even qualify for an experiment under grade school standards for Science Fairs. This proposal from the state results in a very strange explanation of the consequences of "no action"-- which of course would be the very real action of allowing the Jordan Lake rules to be implemented immediately as mandated by both the TMDL and original legislation.

Response 5: This EA is an adequate NEPA document, and addresses the Federal action. The Federal action addressed is the granting of a USACE real estate license for the NCDWR for the demonstration

project placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction is not appropriate in this USACE Wilmington District EA. Reduction of nutrient loading is not a stated project goal and will not be addressed by the preferred alternative. Concerning the potential navigation hazard, safety and marking of circulators is discussed in section 5.4.6 of the EA.

Comment 6: Another serious consideration is the fact that the legislation authorizing NC funding of these devices set forth the goal that if this SolarBee experiment were to "succeed" that it would be followed-up with a very large number of additional SolarBees – creating even more hazards to wildlife and boaters and many more years of increasing nutrient pollution at Jordan Lake. Will this be the precedent for all US ACE reservoirs in North Carolina with nutrient pollution problems?

Response 6: The demonstration project described in the EA is short-term having duration of no more than 24 months. This EA addresses the Federal action, which is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives/future projects beyond the reach of the Federal action and outside of USACE jurisdiction and is not appropriate for this UASCE Wilmington District EA.

Comment 7: This EA is woefully inadequate in providing the information required under NEPA.

Response 7: This EA is an adequate NEPA document and addresses the Federal action. The Federal action is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake.

Comment 8: This project may also need a permit under the federal Rivers and Harbors Act which prohibits the unauthorized obstruction or alteration of navigable waters of the United States, such as Jordan Lake.

Response 8: Section 10 of the Rivers and Harbors Appropriation Act of 1899 states that "...it shall not be lawful to build or commence the building of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures in any port, roadstead, haven, harbor, canal, navigable river, or other water of the United States, outside established harbor lines, or where no harbor lines have been established, except on plans recommended by the Chief of Engineers..." However, Jordan Lake is not classified as a Section 10 water. A permit under the Rivers and Harbors Appropriation Act of 1899 is not required.

Comment 9: [The proposed action] may potentially be in violation of the Clean Water Act due to its specific goal to use waters of the United States for in-stream pollution treatment, in this case reduction of chlorophyll [*sic*] a.

Response 9: The USEPA is aware of the demonstration project, has reviewed the EA, and has provided comments (See B.12 of this Appendix). USEPA comments did not indicate a potential conflict or violation of the Clean Water Act as described in this comment.

B.4 Medora Corporation

Comment 1: I have one correction to make concerning the Environmental Assessment for the Jordan Lake Demonstration Project. On page 2 (pdf page 9) is says "The circulators would upwell water from near the bottom of the hypolimnion to the surface (epilimnion) of the lake."

To suppress cyanobacteria, wherever it is deep enough for a thermocline to develop and establish a hypolimnion and epilimnion, the circulators' intakes are set just above the thermocline. Since a steel plate is located 1 foot below the intake hose, water at that depth is drawn into the hose radially from all directions. That water is pumped to the surface where it spreads out in all directions without turbulence. So only the epilimnion is circulated. The thermocline remains intact. The hypolimnion is not disturbed. We do not want to bring the cool, dense, nutrient rich hypolimnetic water into the epilimnion and photic zone because that could stimulate, rather than suppress, cyanobacteria.

So that sentence should be something like, "Wherever the lake is deep enough to enable a thermocline to establish, the circulators would upwell water from just above the thermocline to the surface of the lake so that only the epilimnion is circulated."

You might also add something like, "Wherever the lake is too shallow for a thermocline to be establish, the circulators would upwell water from just above the bottom to the surface of the lake so that the entire water column is circulated, but the sediment is undisturbed."

Response 1: Comment noted. See Section 3.0 Changes To Environmental Assessment, of this FONSI, for response.

B.5 National Oceanic and Atmospheric Administration, National Marine Fisheries Service

Comment 1: NOAA's National Marine Fisheries Service (NMFS) reviewed *Environmental Assessment (EA) for A Demonstration Project Showing the Impact of Floating In-Lake Long-Distance Circulators in B.E. Jordan Lake*, dated March 2014, and the public notice dated March 7, 2014. Jordan Lake does not include essential fish habitat (EFH), consequently, NMFS offers no comments under the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act. As the nation's federal trustee for the conservation and management of marine, estuarine, and diadromous fishery resources, the following comments and recommendations are provided pursuant to the authorities of the Fish and Wildlife Coordination Act.

This EA examines a proposed 24-month demonstration project for placing up to 36 floating, solar-powered, long-distance circulators within Jordan Lake. The circulators would be placed and monitored in the lake by the North Carolina Division of Water Resources on behalf of the Wilmington District. The purpose is to collect information needed to examine concerns raised about the lake's water quality. Each circulator unit would be anchored to the lake bottom with one or more anchors capable of holding the circulator in place during adverse weather. Each circulator would have an impeller to draw water from depth. Temporary staging areas to assemble and prepare the circulators would be at the Farrington Point and Robeson Creek boat ramps. No impacts to NOAA trust resources are expected from deployment and operation of the floating circulators, and NMFS has no objection to proposed action.

Thank you for the opportunity to provide these comments. Related questions or comments should be directed to the attention of Mr. Fritz Rohde at our Beaufort Field Office, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722, or at (252) 838-0828.

Response 1: Comment noted.

B.6 North Carolina Wildlife Resources Commission

Comment 1: Section 4. 0, Proposed Action (p. 19): "... signs explaining the project and information about the circulators would be posted at boat ramps..." A telephone number to call for more information or to report any issues would be posted on the signs.

In addition to signage, we propose implementing a public awareness campaign to inform the public of the circulators as suggested in Section 5.4.6 p. 60. We recommend DWR implement a public awareness campaign to inform the public of the circulators, their function, their, purpose and the importance of keeping away from and not disturbing the circulators thus reducing the likelihood that the circulators are disturbed, vandalized or removed from the lake. WRC is available to assist with staff and resources in implementing such a campaign.

Response 1: The NCDENR will supply signs and information regarding the circulators and their intended purpose, and will take necessary steps to educate the public about the project and its purpose in order to promote public safety, and minimize potential disturbance, vandalism, or removal of circulators. The NCDENR is amicable to NCWRC's assistance in implementing a public awareness campaign.

Comment 2: Section 5.1.11, Aesthetics (p. 43): "A buoy or marker would be used to mark the anchor point and give warning about the circulator."

We recommend each buoy is marked for number and location, and GPS coordinates reported to the WRC, so each circulator can be relocated easily and quickly if it moves from its original location. WRC will report GPS coordinates of buoys to the Coast Guard, as required by federal law.

Response 2: Each circulator will be marked with a unique identifier. This will not only allow the NCDENR to identify each individual circulator, but will also aid the public in identifying any concerns as well as the manufacturer should maintenance be necessary. Each deployment location will have GPS coordinates recorded for locational purposes, and to determine if any circulator has moved from its original location.

Comment 3: Section 5.3.2.3, Fisheries (p. 46). "The circulators are expected to increase dissolved oxygen in the water above the thermocline."

Circulators could provide a summer refuge for striped bass due to the increase in dissolved oxygen in the water above the thermocline. We recommend limiting the amount of time circulators are out of service during the period of May to September, a critical time for striped bass. We propose a WRC·funded fisheries research project in the area to determine the impact of the circulators on striped bass and other fisheries.

Response 3: Circulators are designed to maintain continuous operation and will remain in service during the period of May to September, for the project's 24-month duration. The State is amicable to a WRC-funded fisheries research project in the project areas.

Comment 4: Figure 19, (p. 18) Location of Circulators in the Morgan Creek and Haw River Arms of Jordan Lake.

The location of circulators HR3, HR4 and HR5 cause us significant concern. We recommend slightly relocating these three units to greatly improve boating safety. HR5 could be moved a short distance to the

West, past the boating access area and out of the main boating traffic channel. HR3 could be moved a short distance North, past the Robeson Creek entrance to the Haw River channel and out of the main boating traffic channel. HR 4 could be moved slightly to the East or West to remove it from the main boating traffic channel. WRC will continue to work with DWR and the contractor in locating all circulators in positions that will provide for optimal circulation and safe boating conditions.

Response 4: Comment noted. The NCDWR will continue to work with the NCWRC concerning circulator placement.

B.7 North Carolina Wildlife Federation (National Wildlife Federation affiliate)

Comment 1: WHEREAS, the United States Congress authorized B Everette Jordan Lake in 1963 and the Final Environmental Impact Study was submitted in 1971, which contained abundant concerns and warnings about future water quality degradation and eutrophication in the reservoir from the United States Environmental Protection Agency and the United States Department of the Interior; and,

WHEREAS, in the interim, eleven (11) Rules have been enacted by the Environmental Management Commission under the title of Jordan Water Supply Nutrient Strategy to control such activities as agriculture, storm water management for development (new and old), protection of riparian buffers, wastewater discharge, and fertilizer management; and,

WHEREAS, in the interim, six (6) Session Laws have been enacted by the North Carolina General Assembly (NCGA) to restore water quality, address solid waste disposal, and to make various changes to Environmental Management Commission Rules under the Jordan Lake Nutrient Strategy; and,

WHEREAS, the 2013 NCGA enacted SB 515, codified as Session Law 2013-395, on a split vote of 61-43 in the House and 28-13 in the Senate and signed by the Governor to delay implementation of measures to address water quality issues in Jordan Lake for further evaluation and exploration of measures and technologies to improve water quality in the lake for a period of three (3) years; and,

WHEREAS, the NCGA included funding for experimental aeration equipment in the approved budget in the amount of$1,350,000 in 2014 and $300,000 in 2015 from the Clean Water Management Trust Fund and an additional $150,000 each year from the Water Quality budget to finance the purchase and implementation of the Jordan Lake Water Quality Improvement Study; and,

WHEREAS, these funds are important to other land and water conservation projects and funds for these purposes are scarce; and,

WHEREAS, the technology to be applied to Jordan Lake consists of 48 aerators and Jordan Lake consists of 14,000 acres of open water averaging 14 feet deep; and,

WHEREAS, this aeration technology has not been proven to be successful in large bodies of water such as Jordan Lake; and,

WHEREAS, the existing Rules constituting the Jordan Lake Water Supply Nutrient Strategy have not been given adequate time to show positive results in terms of improving water quality of the lake and further delay of these Rules will exacerbate deteriorating water quality in Jordan Lake; and,

WHEREAS, the aeration experiment can be conducted without suspending existing water quality Rules.

THEREFORE, BE IT RESOLVED, by the North Carolina Wildlife Federation in official session on February 15, 2014 that Rules creating the Jordan Lake Water Supply Nutrient Strategy should not be delayed due to the urgency to address deteriorating water quality in Jordan Lake given the great pressure for development in the watershed and its adverse impact on Jordan Lake and its important natural resources and recreational values.

BE IT FURTHER RESOLVED, that North Carolina Wildlife Federation will support all efforts to overturn the unwise action to suspend water quality Rules on Jordan Lake in terms of Federal review by the USEPA or legal action.

Response 1: Comment noted.

B.8 Sierra Club, North Carolina Chapter

Comment 1: Jordan Lake needs science-based solutions to control pollution, not water mixers. And we have the science-based rules that will, based on modeling projections, lead to a cleaner Jordan Lake. The EA itself notes in Section 3.1 "No Action Alternative" that without the addition of the water mixers, it is likely that the water quality in Jordan Lake would gradually improve because the TMDL would remain in place, necessitating nutrient management. But, the EA assumes, incorrectly, that nutrient management strategies (like the Jordan Lake Rules) would stay in place. The Jordan Lake Rules were adopted in 2009 in an effort to clean up the lake, a source of drinking water for 300,000 people. Last year these clean-up rules were delayed for three years by the North Carolina legislature. This was the third legislative delay of the clean-up plan.

Response 1: The Jordan Lake Rules have not been fully implemented; however, as discussed in the EA, portions of them have been. It is these portions that the EA assumes will remain in place. This EA addresses the Federal action which is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction is not appropriate in this USACE Wilmington District EA.

Comment 2: Instead of sticking with the science-based plan to prevent pollution, the legislature directed nearly $2 million in taxpayer funds to a lease of 36 floating water mixers. Excessive nutrients, nitrogen and phosphorus, flow into the lake from stormwater and other sources and contribute to high concentrations of chlorophyll a and algae. The SolarBee water mixers aim to reduce chlorphyll a, but cannot, physically, reduce the inflow of nutrient pollution into Jordan Lake.

Response 2: This EA is an adequate NEPA document, and addresses the Federal action. The Federal action addressed in this demonstration project is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. Reduction of nutrient loading is not a stated project goal and will not be addressed by the preferred alternative.

Comment 3: The pilot project described in the EA is unnecessary because this approach has already been tried and failed in Lake Howell, Cabarrus County, NC. The legislature, DENR and the Corps' EA should have examined the Lake Howell example, including the Lake Howell monitoring and testing results and study conclusion when evaluating the proposed Jordan Lake project.

Lake Howell is a 1,300-acre reservoir that provides water to the Coddle Creek Water Treatment Plant and the Kannapolis Water Treatment Plant. The drainage basin for Lake Howell is approximately 47 square

miles in parts of Cabarrus, Rowan and Iredell Counties. Lake Howell was constructed in 1992-1993 by Cabarrus County and originally called the Coddle Creek Reservoir. Cabarrus County retains ownership of Lake Howell.

It appears that neither the legislature nor DENR reviewed the success rates of SolarBee projects in other places in North Carolina before directing nearly $2 million in state funds to a lease of the technology to be used on Jordan Lake. Cabarrus County tried using SolarBee water mixers to improve water quality in Lake Howell - without success. The apparent lack of comparative research into previous SolarBee projects calls the whole Jordan Lake project into question. The nearly $2M in taxpayer funds being dedicated towards the Jordan Lake pilot project could be better used for conservation projects, such as buffers, to protect clean water in the Jordan Lake watershed.

In 2007, problems were identified with Lake Howell water quality, water supply, taste and odor. The Cabarrus County Water and Sewer Authority focused on aeration as a possible mitigation technique for taste and odor problems tied to algal growth, particularly blue-green algae or cyanobacteria. SolarBee mixing units were chosen as a mitigation measure and a year-long SolarBee pilot project was done. Cabarrus County leased SolarBee water mixers with the aim to reduce metals, dissolved oxygen, algae and chlorophyll a and thereby improve overall water quality, taste and odor in Lake Howell. Cabarrus County worked with the UNC Charlotte Environmental Assistance Office to do monitoring and testing of the SolarBee project.

In 2010 the final recommendation by UNC Charlotte Environmental Assistance Office was to discontinue the SolarBee project due to minimal improvements in water quality and to study developing a nutrient management plan to address problems including chlorophyll a.

Response 3: The Lake Howell experiment had different objectives than those of the Jordan Lake demonstration project and addressed anoxic conditions, as well as the resultant iron and manganese problems in the hypolimnion in front of a drinking water plant. In Lake Howell, only 6 of the recommended 17 circulators were installed. Partial circulator implementation may have been a contributing factor in not achieving satisfactory results at Lake Howell.

Comment 4: Ultimately, North Carolina needs to move forward with planned controls on stormwater runoff from new and existing development, and upgrades to upstream wastewater treatment plants. The Corps can't make that happen, but it can end the sideshow of floating water mixers on Jordan Lake, and thereby take away the state's excuse for further delay of the Jordan Lake Rules.

Response 4: Comment noted.

Comment 5: Developers are getting a three year reprieve from requirements to control their pollution so the nutrient pollution problem may get worse.

Response 5: Comment noted.

B.9 Southern Environmental Law Center (on behalf of the North Carolina Conservation Network)

Comment 1: Yet the EA contains no clear, unambiguous statement of the need for the project beyond these two general statements:

- "There is a need for water quality within the Jordan lake watershed to meet or exceed State water quality standards in order to provide safe drinking water and reduce costs associated with treating water for consumption."
- "From a recreational standpoint water quality needs to be maintained to protect human health and protect aquatic species."

The EA should, instead, have a clear statement of need tailored to the specific water quality issue to be addressed by the project – for instance, a specific statement of the need to address chlorophyll a impairment and reduce nutrient over-enrichment. An appropriate and specific statement of need would provide guidance for the development of an appropriate statement of project purpose.

However, the reduction of nutrient loading is neither the stated goal nor the anticipated outcome of the proposed project, allowing the EA to instead include an inappropriate statement of purpose. According to the EA, the project purpose is to "demonstrate if deployment of in-lake long-distance circulators can reduce chlorophyll a concentrations in Jordan Lake without negatively impacting water quality or other Jordan Lake resources." This statement of purpose is problematic for two primary reasons.

First, the statement of purpose represents a fundamental misunderstanding of the environmental review contemplated by NEPA. As written, the purpose of the project is essentially to see if action enabled by a federal agency can be taken "without negatively impacting" the environment. But this is precisely what the Environmental Assessment itself is supposed to assess. Indeed, if the purpose of the project were to determine whether deploying in-lake circulators could be done without negatively impacting the environment, the purpose could (and should) be satisfied by the analysis conducted pursuant to NEPA. Of course, this would preclude the need to conduct the experiment in the first instance.

It appears that the true purpose of the project is to determine whether the deployment of in-lake circulators will result in sufficient chlorophyll a reductions to allow North Carolina to further delay implementation of the Jordan Lake Rules. Regardless, the State's failure to articulate a coherent project purpose has placed public commenters in the unfair position of having to deduce the real goal of the project. This severely undermines the ability of the public to provide the necessary input to inform the district commander's decision regarding whether to take a closer look at the environmental impact of the project.

Response 1: The purpose and need for this demonstration project are accurate. The project purpose is to demonstrate if deployment of in-lake long-distance circulators can reduce chlorophyll *a* concentrations in Jordan Lake. Reduction of nutrient loading is not a stated project goal and will not be addressed by the preferred alternative. The public's ability to provide comment was in no way undermined by content presented in this EA.

Comment 2: The second problem with the statement of purpose in the EA is that it is not tailored to address any specific, appropriate need identified by the EA, and it makes no attempt to establish the need for the State's proposed experiment. The EA does not explain why it is necessary to address only an effect, rather than the root cause of, nutrient loading. Stated differently, the EA does not explain why it is necessary to combat nutrient loading through "in-lake" technology, rather than by taking additional steps to limit the addition of nutrients to the lake *before* they can contribute to eutrophication. Particularly given the existence of the Jordan Lake Rules, which were designed to stop nutrient pollution at the source, the EA fails to establish the need for a project that, even if successful, would only partially respond to a single effect of nutrient pollution. Indeed, the EA envisions the experiment as a supplement to the implemented portions of the Jordan Lake Rules; no attempt is made to explain why the experiment is necessary when the full implementation of the Rules would use proven techniques and prevent the problem.

An agency is not permitted "to contrive a purpose so slender as to define competing 'reasonable alternatives' out of consideration." However, this is precisely the effect of the purpose and need statement included in the EA under consideration. By asserting a purpose to assess the effectiveness of in-lake technology, and failing to define a need that would be addressed by that purpose, the agency avoids careful consideration of other ways to prevent nutrient loading in Jordan Lake.

Response 2: The purpose and need for this demonstration project are accurate, as the project purpose is to demonstrate if deployment of in-lake long-distance circulators can reduce chlorophyll *a* concentrations in Jordan Lake. Reduction of nutrient loading is not a stated project goal and will not be addressed by the preferred alternative. This EA is an adequate NEPA document, and addresses the Federal action. The Federal action addressed is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction is not appropriate for this USACE Wilmington District EA.

Comment 3: The EA's exclusive focus on circulation technology severely limits its utility. Again, perhaps by design, the EA is drafted to avoid consideration of the alternative crafted through years of stakeholder input, i.e., full implementation of the Jordan Lake Rules. Moreover, the EA does not even evaluate in-lake alternatives to circulators that might also combat the effects of nutrient loading. Consequently, rather than evaluate alternatives to in-lake circulation, the EA merely considers forms of in-lake circulation technology offered by three vendors. The primary distinction between these alternatives is simply their power source. Surely NEPA's requirement for the consideration of alternatives cannot be satisfied where the agency merely examines alternative power supplies to support the machinery contemplated for use during the proposed project.

Response 3: This EA is an adequate NEPA document, and addresses the Federal action. The Federal action addressed is the granting of a USACE real estate license to the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action is outside of USACE jurisdiction and is not appropriate for this USACE Wilmington District EA.

Comment 4: The EA states the purpose of the project is simply to test the effectiveness of in-lake circulation devices, the USACE should consider less harmful ways to conduct the test. Yet, the EA makes no attempt whatsoever to justify the large number of circulators that would be deployed. Notably, when justifying the selection of the proposed action over differently powered alternatives, the agency itself observes that the deployment of fewer circulators would reduce the cost, maintenance requirements, and environmental impacts of the project. However, the EA does not explain why it is necessary to deploy 36 circulators to determine if circulation technology is actually effective. Since all 36 circulators will be purchased from the same company, it is reasonable to assume that they their functionality will be identical. Nothing in the EA explains why the placement of fewer circulators would be inadequate to meet the project goals. Particularly given that the EA identifies adverse impacts, the agency should have addressed whether the deployment of fewer circulators would limit these impacts.

Response 4: Project areas were selected because they exhibit some of the highest chlorophyll *a* readings in Jordan Lake. Figures 14 and 15 in the EA show circulator placement. Based on the demonstration project goals, the design and efficiency of the proposed circulators, the residence time of the project areas, and the hydrologic inputs to the project areas, the NCDENR determined the minimum number of circulators that would be required. In order to meet these goals and have a successful project, without deploying any more circulators than necessary, 36 circulators, placed near the locations shown in EA Figures 14 and 15 are believed to be sufficient.

The Morgan Creek Arm is shallow with a flushing rate less than that of the Haw River Arm. This necessitates circulation of nearly the entire surface area of the Morgan Creek Arm. Placement in the Haw River arm was selected so that water entering from tributaries would be circulated prior to entering the lake proper. In most instances it was determined that one circulator would be sufficient to circulate water entering from individual tributaries.

Comment 5: The agency disingenuously asserts that the proposed action is necessary because it is unclear how long it will take for the partially implemented nutrient management strategy, which the EA concedes will have gradual positive effects of water quality, to fix the problem. This ignores the requirement under both the Jordan Lake TMDL, the Jordan Lake Rules, and/or the Clean Water Act that the State implement measures for "control of both point and nonpoint sources of pollution," rather than purely reactive measures designed to minimize the effect of uncontrolled sources of pollution. In other words, if the State's experiment is not permitted, additional measures will be required.

In the absence of the proposed action, North Carolina will need to implement the remainder of the Jordan Lake Rules, thus speeding the reduction of nutrient loads in the lake. In contrast, the proposed action is, according to State officials, designed to avoid full implementation of the rules. Indeed, because the proposed action does not limit the addition of nutrients to Jordan Lake, the experiment will actually allow the nutrient loading problem in the lake to increase.

Response 5: Currently, the remainder of the Jordan Lake Rules will not be implemented for three years, regardless of actions taken associated with this demonstration project. This EA addresses the Federal action which is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction is not appropriate in this USACE Wilmington District EA. Reduction of nutrient loading is not a stated project goal and will not be addressed by the preferred alternative.

Comment 6: To begin, the EA provides scant explanation of how the circulators work, other than the passing mention that "*[w]ater is drawn up through the intake hose, passed through the impeller, and discharged radially on the water's surface at a non-turbulent velocity*." Notwithstanding, the EA states, without support, that "*[t]he circulators are expected to address the effects*" of nutrient loading "*by suppressing phytoplankton activity*." However, nothing in the document explains how mixing polluted water and discharging it back into the lake impacts phytoplankton activity. Moreover, the EA fails to explain what happens to the nutrients after they are discharged back into the lake. Since the project does nothing to address the addition of nutrients to the lake, and the EA does not explain what the project does with existing nutrients, it strains credulity to conclude that problems caused by nutrients will be fixed.

Response 6: Operation of the proposed alternative is defined in section 3.2 of the EA. Concerning the effects of circulator function, and specifically the suppression of algal blooms, increasing flow rate has been shown to suppress algal blooms in nutrient-rich environments (Hudnell et al., 2010). The project purpose is to demonstrate if deployment of in-lake long-distance circulators can reduce chlorophyll *a* concentrations in Jordan Lake. Reduction of nutrient loading is not a stated project goal and will not be addressed by the preferred alternative.

Hudnell, K. H., Christopher, J., Bo, L., Vic, L., Dennis, H. R., & Joseph, E. (2010). Freshwater harmful algal bloom (FHAB) suppression with solar powered. *Harmful Algae, 9*, 208-217.

Comment 7: While acknowledging that circulator effectiveness will require ongoing maintenance, the EA merely assumes that there will be funding and personnel necessary to undertake the required upkeep.

Response 7: As described in the EA, "the units would be inspected for proper operation and any necessary maintenance performed on a routine basis (at least weekly)." The Legislature has set aside funds for project inspections. Additionally, the lease agreement with the manufacturer will include a maintenance agreement. There will be no cost to the State for physical maintenance, should any be required.

Comment 8: Rather than evaluating actual evidence, the EA simply notes that *"[a]ccording to the State, implementation of circulators . . . is expected to improve water quality by enhancing nutrient management strategies in place,"* without explaining how, in what way, by what mechanism, and to what degree, any specific "nutrient management strategy" will be affected by the circulators or any impairment will be addressed. However, agencies have a "duty under [the] NEPA to exercise a degree of skepticism in dealing with self-serving statements from a prime beneficiary of the project." Instead of questioning the State's murky, unsupported assertion, the EA adopts it without further analysis. The agency cannot reasonably conclude that the circulators will improve water quality by relying solely on an unproven assertion by the very entity seeking permission to place the circulators in the lake.

Response 8: This EA is an adequate NEPA document, and addresses the Federal action. The Federal action addressed is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. Reduction of nutrient loading is not a stated project goal and will not be addressed in this USACE Wilmington District EA. Concerning the suppression of algal blooms, increasing flow rate has been shown to suppress algal blooms in nutrient-rich environments (Hudnell et al., 2010).

Hudnell, K. H., Christopher, J., Bo, L., Vic, L., Dennis, H. R., & Joseph, E. (2010). Freshwater harmful algal bloom (FHAB) suppression with solar powered. *Harmful Algae*, *9*, 208-217.

Comment 9: The EA recognizes that "boaters are the most likely members of the public to come in contact with the circulators" and that circulators "may pose a navigational safety hazard to boaters." Yet, the EA provides scant data to support this statement and provide a baseline to measure effects on recreation. For instance, the EA provides little to no baseline data on such parameters as (1) the types of watercraft that are typically used on Jordan Lake, (2) the frequency with which people engage in other types of recreation on the Lake such as swimming, windsurfing, waterskiing, fishing, etc., (3) the amount of boating and other types of recreation engaged in throughout the year, and (4) the proximity of the circulators to portions of the Lake where these activities can and do take place.

The EA then posits that distributing educational materials and posting signage near the circulators will cause these risks to be "greatly reduced." However, the agency provides no data to identify the level of navigational risk, much less how signs and pamphlets will greatly reduce that risk.

Response 9: That "boaters are the most likely members of the public to come in contact with the circulators" is understood to be true based on circulator locations relative to recreational facilities and lake access points. Additional data or recreational analyses are not required to substantiate this statement. Operators of all watercrafts requiring registration with the State, and individuals in tow behind these watercrafts, were considered boaters for the purposes of this EA. Again, citing installation locations, it is not likely that shore fishing and other land-based recreation will allow contact with circulators and individuals fishing out of boats are considered boaters. Swimming is encouraged and most common in designated swimming areas, which are not in project areas. The Robeson Creek boat ramp is the only boat

ramp/launch point located within either project area, and is located 0.65 miles away from the nearest circulator. Windsurfers, canoers, paddle boarders, kayakers, etc. may encounter circulators; however, due to the relatively low velocity of these vessels and relatively stationary nature of circulators, safety risk to the recreating public during chance collisions is minimal. In comments received from the NCWRC, boating safety near the Robeson Creek entrance to the Haw River channel is specifically acknowledged with no mention of other forms of in-water recreation in project areas.

Comment 10: The EA makes no efforts to assess the level of navigational risk posed by anchoring circulators throughout the project area. It fails to assess the likelihood of a boating accident caused by the placement of circulators in navigable waters frequently used for boating. Nor does it consider how many, or how often, boats will be in the project area over the course of the project period; the speed at which boats travel in Jordan Lake; the distance from which circulators will be visible to boaters; the maneuverability of watercraft; or the expected result of a collision at high speed.

Still, without actually identifying the level of risk imposed by the proposed action, the EA asserts that the risk will be minimized. It assumes that boating accidents will be limited by signage that prohibits anchoring near the circulator. However, it also assumes that all boaters will comply with this prohibition, and fails to acknowledge or consider the possibility, and consequences, of noncompliance. This is a particularly cavalier assumption, given that operator inattention is perennially a leading cause of boating accidents. Similarly, the risk of nighttime collisions is a particular concern, yet the EA makes only the conclusory statement that "[c]irculators would be properly marked to alert boaters of their location during all types of light conditions (day and night)." Yet, the EA contains no detail regarding the planned markings or any support for the proposition that they will be effective at night. The EA also lacks any indication of how the anchoring prohibition will be enforced, for instance, by whom, with what frequency, etc. "Measures designed to render minimal a particular action's impact upon the environment, whether proposed in mitigation or assumed to already exist, are more readily deemed efficacious . . . 'when they are likely to be policed.'"

Response 10: The circulators are not unlike floating markers or buoys used to designate a navigable channel. As described in the EA on page 25, circulators will have to meet all approved signage and markings per the NCWRC's *Navigation Aids and Regulatory Markers*. Just as it is the responsibility of boat operator to avoid striking a navigational buoy, mooring buoy, safety sign, another boat, or any other object while under way, it will be the responsibility of the boat operator to avoid striking the circulators, no matter what the time of day. The circulators will be equipped with strobe lights similar to those found on other navigational aids. Should a boat operator be traveling at a higher rate of speed than the situation allows, the boat is not being operated in a safe manner and the operator is liable.

Comment 11: Another potential risk to aquatic life that was not evaluated in the EA is that posed by the potential promotion of invasive species such as hydrilla. Hydrilla "crowds out beneficial native vegetation" and can "eliminate fish habitat, cause stunting, and reduce the number of harvestable fish" in infested water bodies. This noxious aquatic weed, which has spread throughout North Carolina in recent years, reproduces in large part through fragmentation. Yet, the EA does not assess the risk of spreading this invasive species by increasing fragmentation, and therefore reproduction, of the weed through the circulation process. The agency should more thoroughly consider such collateral negative impacts of the project.

Response 11: Submersed vegetation is addressed in section 5.3.1 of the EA. No submersed aquatic vegetation, which includes exotic invasive species, was found to exist in project areas. The proposed action is not expected to promote the spread of invasive species.

Comment 12: First, the EA does not explain why the proposed action, which contemplates tethering mixers to anchors on the bottom of the lake, will not require a permit pursuant to Section 10 of the Rivers and Harbors Act of 1899 and/or Section 404 of the Clean Water Act.

The Rivers and Harbors Act prohibits the unauthorized obstruction or alteration of navigable waters of the United States, such as Jordan Lake, without a permit from the USACE. Prohibited obstruction includes the construction of any structure in or over any navigable waters. Similarly, the project may implicate Section 404 of the Clean Water Act, which requires a permit prior to the "discharge of dredged or fill material into the navigable waters of the United States." Because the EA does not explain the process involved in the construction of the anchoring mechanism used to tether the circulators, it is unclear whether the full scope of environmental review is satisfied by considering only the grant of a property license. The proposed action may also require a water quality certification under section 401 of the Clean Water Act as an activity requiring a federal license or permit that will result in a "discharge" into navigable waters.

Response 12: This demonstration project will not require any permits pursuant to Section 10 of the Rivers and Harbors Act of 1899 and/or Sections 401 or 404 of the Clean Water Act. Jordan Lake is not classified as a Section 10 water, and the proposed action is not a regulated activity pursuant to Section 404. Circulator anchoring is described in Section 4.0, and in Figures 10 and 11, of the EA.

Comment 13: Second, the proposal and the EA fail to contemplate the potential violation of portions of the Clean Water Act unrelated to the permitting programs. Federal guidance prohibits the use of waters of the United States for in-stream pollution treatment. According to the EPA, "to specifically allow waters of the U.S. to serve as treatment systems to remove pollutants and pollution would be inconsistent with the goals of the Clean Water Act." Moreover, insofar as "biological materials" such as algae are removed from the lake and then, after circulation, added back into the water, arguably a discharge permit would be required for each of the circulators.

By choosing to focus only on the federal action of licensing the placement of circulators, without considering the related federal actions such as implicitly permitting the construction of structures in Jordan Lake, or allowing discharge of pollutants into the lake, the EA fails to consider fully the environmental impact of the proposed action.

Response 13: The USEPA has reviewed the EA, and has provided comments (See B.12 of this Appendix). USEPA comments did not indicate that the proposed action represents a potential conflict or violation of the Clean Water Act as described in this comment.

This EA is an adequate NEPA document, and addresses environmental impacts of the proposed Federal action. The Federal action addressed in this demonstration project is the granting of a USACE license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction is not appropriate in this USACE Wilmington District EA.

B.10 Stormwater Services Group, LLC

Comment 1: The intent of deploying these devices long-term is to eliminate the need for the Jordan Lake Nutrient Management Strategy rules which were approved by all of the stakeholders several years ago, but have been delayed for at least three years by the current state legislators.

The EA does not consider the improvements to Jordan Lake water quality if these devices are not installed and the Jordan Lake rules are allowed to be implemented as originally proposed.

Response 1: As discussed in the EA, the demonstration project is short-term having duration of no more than 24 months. As is also explained in the EA, portions of the JLNMS have been implemented and will remain in place during this demonstration project. This EA addresses the Federal action, which is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction and is not appropriate for this UASCE Wilmington District EA.

Comment 2: These devices do not reduce the amount of nitrogen and phosphorous entering Jordan Lake. Therefore, these devices will have no affect on the TMDLs established for the lake. The USEPA will most likely require the implementation of the very BMPs that the current legislators wish to delay indefinitely.

Response 2: Comment noted. The USEPA is aware of the demonstration project, has reviewed the EA, and has provided comments (See B.12 in this Appendix). USEPA comments did not indicate that any additional action was required regarding implementation of BMPs.

Comment 3: These devices do not reduce the amount of metals, suspended solids, oil & grease, and trash that enters Jordan Lake. The BMPs proposed under the Jordan Lake Nutrient Management Strategy rules would reduce these other pollutants entering the lake. By delaying the rules while these unproven devises are studies, the water quality continues to deteriorate.

I am on the board of the non-profit Clean Jordan Lake organization. Our mission is to remove trash and litter from the Jordan Lake shoreline. Since 2008, over 2900 volunteers have removed nearly 90 tons of trash and 3400 tires. These devices do nothing to remove this type of pollutant. Proposed rules would, as a side effect, help control the trash load entering the lake. Can these devices withstand a truck tire slamming into them during a high flow event on the Haw River?

Response 3: Comment noted. Reduction of metals, suspended solids, oil & grease, and trash are not stated project goals and will not be addressed by the preferred alternative. The results of this demonstration project may influence future NCDWR water quality actions in and near project areas. Additionally, circulators will withstand debris impacts during high flow conditions.

Comment 4: The EA does not address the issue of increased mercury accumulation in the edible biomass. Research by others suggests that algae have a beneficial property of removing mercury from the water column.

Response 4: The NCDENR has sampled fish tissue at various Jordan Lake locations since 1982 and plans to continue until at least 2018. Fish tissue data exist for the following locations: New Hope Creek Arm (1982-1983), Morgan Creek Arm (1982-1983), Ferrington Point (1982, 1990, 1998, 2008-present), Beaver Creek (1982-1983), Haw River Arm below Stinking Creek (1982, 1983, 1990), and near the dam (1998). These data indicate that mercury levels are below FDA action levels in nearly all species sampled, including largemouth bass and other game fish. Many factors including diet, size, and age play a role in determining methylmercury (MeHg) concentrations in individual fish tissue samples and NCDENR data indicate that MeHg concentrations can vary widely within species.

Blue green algae are not a preferred food for many zooplankton species as they often contain toxins which can adverse effects (Fulton and Paerl, 1987; DeMott et al, 1991; Ferrao-Filho et al, 2000). It is expected during the demonstration project that blue-green algae concentrations will fall, promoting

growth of more desirable green algae. Green algae present a higher quality food source for zooplankton, leading to higher somatic growth dilution of MeHg. Increased somatic growth dilution will not increase levels of MeHg in zooplankton, or in higher order predators including game fish (Karimi et al, 2007; Ward et al, 2010).

Fulton, Rolland S. and Hans W. Paerl (1987), Effects of colonial morphology on zooplankton utilization of algal reousrces during blue-green (*Microcystis aeruginosa*) blooms. *Limnology and Oceanography, 32(3),* 634-644.

DeMott, William R., Qing-Xue Zhang, and Wayne W. Carmichael (1991). Effects of toxic cyanobacteria and purified toxins on the survival and feeding of a copepod and three species of *Daphnia. Limnology and Oceanography, 36(7),* 1346-1357.

Ferroa-Filho, Aloysio S., Sandra M.F.O. Azevedo, and William R. Demott (2000). Effects of toxic and non-toxic cyanobacteria on the life history of tropical and temperate cladocerans, *Freshwater Biology, vol. 45,* 1-19.

Karimi, Roxanne, Celia Y. Chen, Paul J. Pickhardt, Nicholas S. Fisher, & Carol L. Folt (2007). Stoichiometric controls of mercury dilution by growth. *Proceedings of the National Academy of Sciences, vol. 104, no. 18,* 7477-7482.

Ward, Darren M., Keith H. Nislow, Celia Y. Chen, & Carol L. Folt (2010). Rapid, efficient growth reduces mercury concentrations in stream-dwelling Atlantic salmon. *Transactions of the Americans Fisheries Society, vol. 139,* 1-10.

Comment 5: The EA admits that these devices will occasionally cause anoxic conditions. The EA does not explain how these devices will be controlled such that water is always drawn from above the thermocline. The lake level rises and falls eight or more feet several times a year. Do we want a device installed that we know will cause more water quality problems?

Response 5: A discussion of anoxic conditions is presented in Section 4.0 of the EA. It is highly unlikely that anoxic conditions would exist due to the demonstration project; however, the NCDENR cannot state anoxia will never exist in project areas. Due to shallow waters in the Morgan Creek Arm (generally less than 10 feet), anoxic conditions are unlikely to exist. The Haw River Arm is much deeper (upwards of 40 feet), and has the potential to contain anoxic areas below the thermocline. Lake level does fluctuate throughout the year as a result of USACE operations, rainfall, drought, and inflow variations. The circulator manufacturer will monitor lake levels, and will adjust circulator intake hoses as required to preclude circulation of water from below the thermocline.

Comment 6: Under Section 3.1, the writer of the EA is being disingenuous in stating that local and municipal ordinances would help the water quality. Current state law prohibits local bodies from passing environmental regulations stricter than the state regulations.

Response 6: There are existing regulations in place, including portions of the Jordan Lake Nutrient Strategy. These State and/or local and municipal ordinances will remain in place during the study. New rules/regulations/ordinances may or may not be enacted over the course of the study, but it is fully expected that existing rules will remain.

Comment 7: The EA does not address the potential pollutant issues if the batteries or solar cells on these devices were to sink into the lake.

Response 7: Batteries will be enclosed in a double walled housing, and then placed into a stainless steel cage. Solar panels are sealed. Batteries and solar panels are not expected to cause any toxicity issues if submerged. The NCDENR will maintain a GPS record of all circulator locations; if a machine were to sink it could be located easily.

Comment 8: Each device would impede navigation within a radius of at least 210 feet up to 345 feet from the device. This is 3 to 9 acres of impeded surface water per device. One of Jordan Lake's primary usage is for recreation. These devices are being placed in areas popular with boaters and skiers during the day, and popular with paddlecraft operators at twilight for observing eagles and ospreys.

The number of devices proposed for the Morgan Creek arm has essentially eliminated that portion of the lake open to boaters.

The devices in the Haw River arm near Roberson Creek will create a dangerous navigation hazard due to the confined channel.

Response 8: The figure on page 21 of the EA shows the potential swing diameter of each circulator. The values used were conservative, representing the greatest area in which the circulator would float. As explained in the EA on page 19, the numbers were calculated using depths published by the Triangle J Council of Governments and the maximum tether length suggested by the manufacturer (seven feet of tether for every foot of water depth).

Navigation will not be impeded an area with a radius of up to 345 feet around each device; rather, that is the area that the circulator will be floating in. As is explained in the EA in section 5.4.3, boaters will not be prevented from approaching the circulators; just from anchoring in their immediate vicinity.

Comment 9: The EA does not adequately address the turbidity caused by the anchoring system swinging across the lake bottom and stirring up sediment.

Response 9: Upon installation, the anchor itself is not expected to move. Any sediment suspended during installation would be localized and held near the bottom of the lake. Suspended sediment is not expected to rise in the water column or be carried to other areas of Jordan Lake. Overall lake turbidity would be unaffected.

Comment 10: The EA states *"Circulators and accompanying markers would present a small visual impact from shore or boat, but would not significantly impact aesthetic resources."* This is an opinion. I am an avid boater on Jordan Lake, and I think these devices, and there will be 36 of them, will be a visual blight upon the natural scenery of this lake.

Response 10: Comment noted. Aesthetics are addressed in section 5.1.11 of the EA.

Comment 11: The EA does not adequately address the impact on the feeding habits of the American Bald Eagle (*Haliaeetus leucocephalus*) or the Osprey (*Pandion haliaetus*). The Bald Eagle is a protected species known to feed and roost near where these devices will be deployed. I would suggest that the USFWS review this EA to determine any impacts to birds that feed by diving into the water that these large devices might have.

Response 11: The USFWS was provided a copy of the EA for review and comment. In their comments, they state "In accordance with the Endangered Species Act of 1973, as amended, (ESA) and based on the information provided, and other available information, it appears the action is not likely to adversely

affect federally listed species or their critical habitat as defined by the ESA. We believe that the requirements of section 7 (a)(2) of the ESA have been satisfied for this project."

Comment 12: The writer of the EA is being disingenuous where three different devices are being compared. NCDENR decided that the SolarBee circulator device made by Medora Corporate will be the selected device before the EA was finished.

Response 12: The EA compares multiple long distance circulator alternatives. Based on published specifications, the preferred alternative is best suited for use in this demonstration project and will allow for the installation of as few circulators as possible as compared to other alternatives. Additionally, due to technical and operational differences among alternatives considered, the NCDENR felt it best to state a specific manufacturer so details of operation, maintenance, deployment could be discussed, as these items are different among circulator manufacturers.

B.11 Town of Cary, NC

Comment 1: Jordan Lake is a critical resource for the Triangle Region. The Town of Cary operates the Cary/Apex Water Treatment Facility (CAWTF,) co-owned with the Town of Apex, to provide drinking water from Jordan Lake to over 210,000 people in Cary, Apex, Morrisville, and the Wake County portion of Research Triangle Park. The Town also provides raw water from the pump station at the CAWTF-currently the only water supply withdrawal facility on Jordan Lake - to Chatham County.

The Division of Water Resources' Demonstration Project is unlikely to have any impact on the raw water supplied to the CAWTF. Each of the proposed project areas (Morgan Creek and Haw River Arms) is approximately 6 miles from the CAWTF raw water intake and the in-lake long-distance circulators are unlikely to have any impact on the raw water quality at the CAWTF intake. As noted on page 58 of the EA, "The proposed action may improve the water quality within the project areas of Jordan Lake by reducing the frequency of algal blooms, increasing dissolved oxygen, and increasing the pH in the project areas. However, due to the distance of the [Cary/Apex] raw water intake to the project areas (approximately six miles from each project area), it is unlikely that any benefit would be seen at the intake."

The Study Plan for the Assessment of In-Lake Mechanical Reductions of Adverse Impacts Related to Excess Nutrients in the Morgan Creek and Haw River Arms of Jordan Lake may be sufficient for the purposes of evaluating the effectiveness of the Demonstration Project. However, should the State of North Carolina propose the deployment of in-lake long-distance circulators nearer to the CAWTF raw water intake, additional information about the effects of such circulators on the operation of the CAWTF should be provided for public comment.

The Town of Cary is committed to being a good steward of our finite natural resources. We believe that a science-based approach to managing Jordan Lake's water quality will have a net positive benefit for our citizens and for the communities in the watershed. We look forward to working with other stakeholders and state officials as we chart a course for the future of the Jordan Lake watershed.

Response 1: Comment noted.

B.12 US Environmental Protection Agency, Region 4

Comment 1: State WQS – EPA notes that the proposed demonstration project is being implemented to address elevated Chl a levels in Jordan Lake, however, we would expect other parameters to be impacted such as Dissolved Oxygen and Temp. EPA recommends that all other WQ parameters be closely monitored to ensure that the proposed demonstration project does not cause or contribute to violations of State water quality standards.

Response 1: In addition to chlorophyll *a*, the NCDENR will be monitoring dissolved oxygen, temperature, pH and specific conductance through the water column at set depths at all sites. Chlorophyll a, nutrients, turbidity, and secchi depth will also be monitored.

Comment 2: Phosphorus and Nitrogen Loadings - Chl a is a biological response to elevations in nutrients (phosphorus and nitrogen) in the Lake. If the project is not addressing nutrient loading from the watershed, the underlying cause of biological activity (elevated Chl a) is not being addressed. Since the proposed project is not removing nutrients from the system, once the Solar Powered In-Lake Long-Distance Circulators are removed, it is anticipated that the elevated Chl a levels would return.

Response 2: Comment noted. Reduction of nutrient loading is not a stated project goal and will not be addressed by the preferred alternative. The results of this demonstration project may influence future NCDWR water quality actions in and near project areas.

Comment 3: "Jordan Lake Rules" Implementation – As stated in the EA, Jordan Lake is impaired for Chl a and low DO. Per the Jordan Lake Phase I Nutrient TMDL "*Elevated nutrient concentrations in Jordan Reservoir result from a combination of point and nonpoint source loads. The point source loads include three major wastewater treatment plants at the headwaters of the New Hope arm and seven major wastewater treatment plants upstream on the Haw River. There are also several smaller dischargers. Nonpoint loading includes runoff from urban areas in Durham, Chapel Hill, Cary, Burlington, Greensboro, and several other small municipalities, as well as a variety of rural sources*." Steps have been taken to address non-point pollution issues in the watershed through the development and implementation of a nutrient management strategy (see http://portal.ncdenr.org/web/jordanlake). EPA supports these efforts to reduce nutrient loading in the watershed and to Jordan Lake and we see these management strategies as long term solutions to Jordan Lake WQ issues. EPA also notes that several modifications to the 2009 Jordan Lake Rules law have been enacted that impact the implementation timeline of the nutrient strategy (as noted in 5.1.6 - water quality section of the EA). EPA recommends that the Jordan Lake nutrient management strategy and the recent changes be more comprehensively discussed under the "no action" alternative - Section 3.1.

Response 3: There have been several alterations to the Jordan Lake Nutrient Management Strategy (JLNMS) since its creation and approval in 2009. While some portions have been implemented, others have been delayed by the North Carolina Legislature. Under the "no action" alternative, the EA discusses, and speculates, what changes to water quality would occur should no further action be taken during the 24 month term of the demonstration project. Implementing the JLNMS in its entirety would require action from the North Carolina Legislature, and would hence not be a "no action" alternative. Also as discussed in the EA, it is not anticipated that the rules would be fully implemented during the duration of the demonstration project. Because they would currently require action from the North Carolina Legislature, and are not anticipated to have any additional parts implemented during the demonstration project, further implementation was not considered in the EA.

Comment 4: Recreation and boater safety – With Jordan Lake being a major regional recreation attraction it is expected that boater traffic is significant in the summer months. Recreation is also an authorized use of Jordan Lake. EPA notes that figure 25 shows an actual deployment of the proposed solar circulators. EPA notes that these circulators sit very low in the water and may be difficult to see by boaters; however we note that navigational markings and strobes are being proposed. EPA remains concerned that the proposed circulators may pose a significant impact to boater traffic in both the Haw River and Morgan Creek Arms of the Lake.

Response 4: Comment noted. Safety is addressed in section 5.4.6 of the EA.

Comment 5: Impacts to Fish - It is stated in the EA that "*There is a possibility that hypoxic or anoxic conditions may periodically exist; however, any decrease in dissolved oxygen levels at the surface are expected to be relatively short lived, lasting no more than a few days*" (p. 25 of EA). Is there data that supports these conclusions? If so, it should be provided in the EA. EPA is concerned that the impact of hypoxic conditions mentioned on p.25 on fish species has not been fully explored in the EA. In addition, EPA notes that section 5.3.2.3 - Fisheries Section - does not include the above referenced (potential hypoxic condition) as a potential impact on fisheries.

Response 5: Circulators will not directly affect potential hypoxia and will not be cycling water from below the thermocline (should it exist). Should lake turnover occur, any reduction in DO in epilimnion waters is expected to be short lived. The goal of this demonstration project is to reduce chlorophyll *a* levels, which is expected to lower BOD load and result in reduced benthic hypoxia. The proposed action would not have an adverse impact on fish in the project areas.

Comment 6: Uncertainty of In-Lake Long-Distance Circulators –With the understanding that this is a "demonstration project", EPA notes that there is uncertainty relating to the effectiveness and overall performance of the proposed system. The EA does not disclose how many times the proposed system and has been deployed, what types of lakes the system has been deployed in, and how they have performed in other deployments. EPA believes this type of information is critical when making an informed decision relating to the proposed action.

Response 6: According to the manufacturer, circulators similar or identical to the preferred alternative have been deployed in over 300 lakes and reservoirs around the world with successful results (http://lakes.medoraco.com/lakes/customer-experiences). Although representing a relatively small percentage of deployments to date, there have been applications in waterbodies of similar acreage to project areas defined for this demonstration.

B.13 US Fish and Wildlife Service

Comment 1: In accordance with the Endangered Species Act of 1973, as amended, (ESA) and based on the information provided, and other available information, it appears the action is not likely to adversely affect federally listed species or their critical habitat as defined by the ESA. We believe that the requirements of section 7 (a)(2) of the ESA have been satisfied for this project. Please remember that obligations under the ESA must be reconsidered if: (I) new information identifies impacts of this action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

Response 1: Comment noted. Should any impacts or the scope of the project change, the NCDENR will notify the USFWS and coordinate as necessary.

Distinctive Public Comments Received during the Public Comment Period

B.14 Mr. Claude Burkhead

Comment 1: Total waste of valuable time and money.

Response 1: Comment noted.

Comment 2: Need to address source of algae growth problem and quit putting off fixing upstream issues.

Response 2: This EA is an adequate NEPA document, and addresses the Federal action. The Federal action addressed in this demonstration project is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. Reduction of nutrient loading is not a stated project goal and will not be addressed by the preferred alternative. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction is not appropriate in this USACE Wilmington District EA.

Comment 3: Forestalling addressing actual source of algae growth is obviously in interests of all parties loading nutrients upstream, including their powerful political allies, and not in interests of the health of Lake Jordan and its beneficiaries.

Response 3: Comment noted.

Comment 4: Political boondoggle of giant proportions.

Response 4: Comment noted.

Comment 5: Circulators will constitute navigational hazards.

Response 5: Comment noted. Safety is discussed in Section 5.4.6 of the EA.

Comment 6: Circulators are a useless and 'feel-good' band aid.

Response 6: Comment noted.

Comment 7: Bidding and award process smells to high Heaven.

Response 7: Comment noted.

Comment 8: This entire operation has not one single positive attribute, other than to benefit politicians, circulator company, and those upstream causing the algae problem.

Response 8: Comment noted.

B.15 Ms. Sue Oury

Comment 1: Recently saw a program that stated they used leopard mussels to clean up the Great Lakes. That is a large fresh water lake and the water was clear! A natural environmental clean-up. Why can't we do that? If it worked in the Great Lakes sound like it might work here.

Response 1: This EA addresses the Federal action, which is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction and is not appropriate in this USACE Wilmington District EA.

B.16 Mr. William Villafranca

Comment 1: What would it take to release the water downstream from the bottom of the dam? They do it in Texas that way and it has several great benefits. That cold, bottom of the lake water can be good for the downstream water conditions, as well as, improving the lake water from which it comes, particularly if the money used on the circulators is used to pump a portion of the released water back upstream. From there, it can be returned to the top layers of the water column providing oxygen and reducing the temperature that the algae like. I certainly don't have those financial numbers, but I understand it's being done in other places.

Response 1: This EA addresses the Federal action, which is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake.

The releases from Jordan Dam are managed pursuant to the Wilmington District's Water Control Manual for authorized project purposes. These releases are governed by several factors including flood control operations, water quality parameters, and downstream flow requirements. No changes in the Water Control Manual have been proposed or were considered. The alternative proposed is not considered a practical alternative and is not addressed in this EA.

During the summer when the reservoir is stratified, releases of surface waters are made to improve the dissolved oxygen of downstream releases. Additionally, the surface releases may reduce the residence time of the surface waters in the lake. During the other times of year when the reservoir is mixed, the level of releases is not a factor of water quality.

Comment 2: What about performing one-third lake level purges like those conducted on upstream mountain lakes as they prepare for winter run-off? In general this suggestion acknowledges that Jordan Lake water is allowed to get stale and methods should be considered for large exchanges of stored water.

Response 2: The releases from Jordan Dam are managed pursuant to the Wilmington District's Water Control Manual for authorized project purposes. These releases are governed by several factors including flood control operations, water quality parameters, and downstream flow requirements. No changes in the Water Control Manual have been proposed or were considered. The alternative proposed is not considered a practical alternative and is not addressed in this EA.

Comment 3: I think this is a crazy, wasteful idea that needs to have a successful track record on a smaller scale lake that is not in such dire need of quick improvement. Correct me if I'm wrong, but this technique, although maybe in experimental use, has not proven itself effective yet, right?

Response 3: According to the manufacturer, circulators similar or identical to the preferred alternative have been deployed in over 300 lakes and reservoirs around the world with successful results (http://lakes.medoraco.com/lakes/customer-experiences).

B.17 Mr. Will Wilson

Comment 1: One problem with the reservoir is high mercury levels is fish tissues, documented by the EPA's 2000-2004 US Lake Study:
http://water.epa.gov/scitech/swguidance/fishstudies/lakefishtissue_index.cfm

The SolarBee installation, designed to reduce algal blooms, ignores several recent studies that indicate that algal blooms dilute the mercury that makes its way up the trophic levels to game fish. Several of those studies are cited below. If the SolarBee installation succeeds, then we can anticipate that Jordan Lake's mercury levels will exceed EPA advisory levels.

Chen, C.Y., and C.L. Folt. 2005.
High Plankton Densities Reduce Mercury Biomagnification.
Environ. Sci. Technol. 39: 115-121.

Chen, C.Y., R.S. Stemberger, N.C. Kamman, B.M. Mayes, and C.L. Folt. 2005.
Patterns of Hg Bioaccumulation and Transfer in Aquatic Food Webs Across Multi-lake Studies in the Northeast US.
Ecotoxicology 14: 135-147.

Chen, C.Y., N. Serrell, D.C. Evers, B.J. Fleishman, K.F. Lambert, J.
Weiss, R.P.\ Mason and M.S. Bank. 2008.
Methylmercury in Marine Ecosystems: From Sources to Seafood Consumers Environmental Health Perspectives 116: 1706-1712.

Pickhardt, P.C., C.L. Folt, C.Y. Chen, B. Klaue and J.D. Blum. 2002.
Algal Blooms Reduce the Uptake of Toxic Methylmercury in Freshwater Food Webs.
Proceedings of the National Academy of Sciences 99:4419-4423.

Watras, C.J., K.A. Morrison, J.S. Host, and N.S. Bloom. 1995.
Concentration of Mercury Species in Relationship to Other Site-Specific Factors in the Surface Waters of Northern Wisconsin Lakes.
Limnology and Oceanography 40: 556-565.

Watras, C.J., R.C. Back, S. Halvorsen, R.J.M. Hudson, K.A. Morrison, and
S.P. Wente. 1998.
Bioaccumulation of mercury in pelagic freshwater food webs.
The Science of the Total Environment 219: 183-208.

Response 1: The NCDENR has sampled fish tissue at various Jordan Lake locations since 1982 and plans to continue until at least 2018. Fish tissue data exist for the following locations: New Hope Creek Arm (1982-1983), Morgan Creek Arm (1982-1983), Ferrington Point (1982, 1990, 1998, 2008-present), Beaver Creek (1982-1983), Haw River Arm below Stinking Creek (1982, 1983, 1990), and near the dam (1998). These data indicate that mercury levels are below FDA action levels in nearly all species sampled, including largemouth bass and other game fish. Many factors including diet, size, and age play a role in determining methylmercury (MeHg) concentrations in individual fish tissue samples and NCDENR data indicate that MeHg concentrations can vary widely within species.

Blue green algae are not a preferred food for many zooplankton species as they often contain toxins which can adverse effects (Fulton and Paerl, 1987; DeMott et al, 1991; Ferrao-Filho et al, 2000). It is expected during the demonstration project that blue-green algae concentrations will fall, promoting growth of more desirable green algae. Green algae present a higher quality food source for zooplankton, leading to higher somatic growth dilution of MeHg. Increased somatic growth dilution will not increase levels of MeHg in zooplankton, or in higher order predators including game fish (Karimi et al, 2007; Ward et al, 2010).

Fulton, Rolland S. and Hans W. Paerl (1987), Effects of colonial morphology on zooplankton utilization of algal reousrces during blue-green (*Microcystis aeruginosa*) blooms. *Limnology and Oceanography, 32(3),* 634-644.

DeMott, William R., Qing-Xue Zhang, and Wayne W. Carmichael (1991). Effects of toxic cyanobacteria and purified toxins on the survival and feeding of a copepod and three species of *Daphnia. Limnology and Oceanography, 36(7),* 1346-1357.

Ferroa-Filho, Aloysio S., Sandra M.F.O. Azevedo, and William R. Demott (2000). Effects of toxic and non-toxic cyanobacteria on the life history of tropical and temperate cladocerans, *Freshwater Biology, vol. 45,* 1-19.

Karimi, Roxanne, Celia Y. Chen, Paul J. Pickhardt, Nicholas S. Fisher, & Carol L. Folt (2007). Stoichiometric controls of mercury dilution by growth. *Proceedings of the National Academy of Sciences, vol. 104, no. 18,* 7477-7482.

Ward, Darren M., Keith H. Nislow, Celia Y. Chen, & Carol L. Folt (2010). Rapid, efficient growth reduces mercury concentrations in stream-dwelling Atlantic salmon. *Transactions of the Americans Fisheries Society, vol. 139*, 1-10.

Representative Public Comments Received during the Public Comment Period

B.18 Aesthetic Resources

Comment 1: "I think they definitely will detract from the beauty of the lake."

Response 1: Comment noted. Aesthetics are addressed in section 5.1.11 of the EA.

B.19 Clean Water Act Compliance

Comment 1: "The federal Clean Water Act requires that pollution be treated at the source of the problem, not downstream in public waters. By employing floating mixers (known as SolarBees) downstream in Jordan Lake the state is not complying with federal law. This is unacceptable!"

Response 1: The USEPA is aware of the demonstration project, has reviewed the EA, and has provided comments (See B.12 in this Appendix). USEPA comments did not indicate that the proposed action represents potential conflict or violation of the Clean Water Act as described in this comment.

B.20 Lack of Scientific Evidence

Comment 1: "There is no evidence that these poorly-conceived floating mixers will clean up the pollution."

Response 1: The purpose of the demonstration project is not to clean up pollution, rather to reduce the effects of increased nutrients seen in the lake. According to the manufacturer, Solarbee circulators have been placed in over 300 lakes and most have reported seeing improvements in water quality (http://lakes.medoraco.com/lakes/customer-experiences). Increasing flow rate has been shown to suppress algal blooms in nutrient-rich environments (Hudnell et al., 2010).

Hudnell, K. H., Christopher, J., Bo, L., Vic, L., Dennis, H. R., & Joseph, E. (2010). Freshwater harmful algal bloom (FHAB) suppression with solar powered. *Harmful Algae, 9*, 208-217.

Comment 2: "There is also no evidence that these mixers will work to clean up the pollution in this popular recreational destination."

Response 2: The purpose of the demonstration project is not to clean up pollution, rather to reduce the effects of increased nutrients seen in the lake. According to the manufacturer, Solarbee circulators have been placed in over 300 lakes and most have reported seeing improvements in water quality (http://lakes.medoraco.com/lakes/customer-experiences). Increasing flow rate has been shown to suppress algal blooms in nutrient-rich environments (Hudnell et al., 2010).

Hudnell, K. H., Christopher, J., Bo, L., Vic, L., Dennis, H. R., & Joseph, E. (2010). Freshwater harmful algal bloom (FHAB) suppression with solar powered. *Harmful Algae, 9*, 208-217.

B.21 Safety Concerns

Comment 1: "A million people visit the lake each year to camp, swim, boat, paddle or fish and these floating mixers pose a real threat. The mixers sit low in the water and could be easily missed by boaters, water skiers and jet skiers."

Response 1: Safety is addressed in section 5.4.6 of the EA. The circulators would be marked appropriately to ensure visibility during both daytime and nighttime navigation, as outlined in the *U.S. Aids to Navigation System* published by the U.S. Coast Guard.

B.22 Perceived Single-Source Contract

Comment 1: "The $1.65 million state earmark that funded the SolarBee project created a single-source, no-bid contract that funnels money to the company that makes the mixers. This means no competition and no serious evaluation of whether this technology will work on Jordan Lake."

Response 1: Of the available technologies that satisfy project purpose, minimize environmental impacts, and align with provisions of Session Law 2013-360§14.3A.(a)., the SB10000v18 model solar-powered circulator, manufactured by the Medora Corporation, was selected as the preferred alternative. Alternatives considered are presented in section 3.0 of the EA.

This is a demonstration project. Water quality improvement is not guaranteed as a result of implementation of the preferred alternative; however, based on existing data, NCDENR believes the demonstration may improve water quality in project areas.

B.23 Water Quality

Comment 1: "Jordan Lake is plagued by nitrogen and phosphorus pollution from upstream sources and these mixers do not treat that type of pollution. When these mixers fail to do their job, the condition of Jordan Lake will be worse than ever."

Response 1: Reduction of nutrient loading is not a stated project goal and will not be addressed by the preferred alternative. Increasing flow rate has been shown to suppress algal blooms in nutrient-rich environments (Hudnell et al., 2010).The demonstration project, regardless of degree of success, will not contribute to water quality degradation in project areas.

Hudnell, H.K.., Christopher, J., Bo, L., Vic, L., Dennis, H. R., & Joseph, E. (2010). Freshwater harmful algal bloom (FHAB) suppression with solar powered. *Harmful Algae, 9*, 208-217.

Comment 2: "It's just another way for lawmakers to delay real pollution controls on this beautiful lake."

Response 2: Comment noted.

B.24 Water Quality/Lack of Scientific Evidence

Comment 1: "North Carolina needs to move forward with the promised controls of runoff from new and existing development, and upgrades, to upstream wastewater treatment plants, NOT by employing unproven floating mixers in the lake."

Response 1: The Federal action addressed in this EA is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake. The assessment of additional alternatives beyond the reach of the Federal action and outside of USACE jurisdiction and is not appropriate in this USACE Wilmington District EA.

According to the State, the purpose of the demonstration project is not to clean up pollution, rather to reduce the effects of increased nutrients seen in the lake. Solarbee circulators have been placed in over 300 lakes and most have reported seeing improvements in water quality (http://lakes.medoraco.com/lakes/customer-experiences). Increasing flow rate has been shown to suppress algal blooms in nutrient-rich environments (Hudnell et al., 2010).

Hudnell, H.K., Christopher, J., Bo, L., Vic, L., Dennis, H. R., & Joseph, E. (2010). Freshwater harmful algal bloom (FHAB) suppression with solar powered. *Harmful Algae, 9*, 208-217.

B.25 Wildlife Concerns

Comment 1: "They (circulators) represent a hazard to birds and fish."

Response 1: Table 8 in the EA shows water velocities versus distance from the circulator hose intake; water velocities leaving the circulator are similar. The velocity of the water leaving the circulator head is 0.2 fps. By the time the water reaches the end of the float (eight feet) the velocity has decreased to 0.13 fps, and velocities continue to decrease quickly with distance. Water is not being drawn down from the surface near the circulator head and would not be much different than landing in the in water with a very mild current. Should waterfowl land near the circulator they would be gently pushed away from the circulator, not pulled under water or harmed.

According to the "2013 U.S. Fish and Wildlife Service (USFWS) Revised Voluntary Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning," the preferred type of light, for tall structures that must be lit, is a flashing white or red light. With respect to towers, antennas, and other tall structures, recent studies show that the use of white strobe, red strobe, or red flashing lights will provide significant reductions in bird fatalities. The strobes used on the circulators will be white. It is not anticipated that the white flashing strobe lights used on the circulators will have a significant impact on migratory birds and are the recommended type to be used by the USFWS.

Additionally, he NCWRC was provided a copy of the EA and in turn submitted comments. The NCWRC states that "[I]n the scoping comments the Commission requested specific information regarding aquatic habitat and fisheries, as well as boating traffic and safety be included in the environmental assessment (EA). The EA is comprehensive and thoroughly addresses many of the Commission's initial concerns regarding the demonstration project." The proposed action would not have an adverse impact on fish in the project areas.

B.26 Other Comments (Comments which did not fit Categories Above)

Comment 1 (labeled Other (1): Suggested an additional alternative (lake restorers which are rafts that have specific plants growing on it that thrive on nitrates and oil and other pollutants.

Response 1: These bioremediation methods were not considered for this demonstration project. However, this information has been sent to NCDWR for consideration for future projects.

Comment 2 (Other (2): Suggested the KIRA Ionizer system as another alternative to proposed action.

Response 2: This EA addresses the Federal action, which is the granting of a USACE real estate license for the NCDWR for placement of circulators within the Morgan Creek and Haw River Arms of Jordan Lake as a demonstration project. This alternative was not considered for this demonstration project. However, this information has been sent to NCDWR for consideration for future projects.

Comment 3 (Other (3): Statement of general support for the demonstration project.

Response 4: Noted.

APPENDIX B (CONTINUED)
INDEX OF PUBLIC COMMENTER AND COMMENT CATEGORIES

Due to the number and repetitiveness, public comments received were categorized into categories. Responses are provided to by category. Index includes commenter, comment category, and indicator of appropriate Appendix B response.

Count	Commentor Last Name, Initial		Comment Category (See Appendix B & Note Below)
1	A	G	LE, SC
2	Abashian	T	LE, SC
3	Ackerman	M	SS, WQ
4	Adams	K	CWA, WQ
5	Adams	E	SS, WQ
6	Adams, Sr	M	LE, WQ
7	Adkins	Y	SS, WQ
8	Adkins	O	CWA, WQ
9	Adriance	G	LE, SC
10	Alford	B	LE, SC
11	Allen	M	LE, WQ
12	Allen	F	LE, WQ
13	Allen	S	LE, SC
14	Allen	S	CWA, LE, WQ
15	Allen	J	CWA, WQ
16	Almeida	G	SS, WQ
17	Almond	D	SS, WQ
18	Alt	A	LE, WQ
19	Altman	G	LE, WQ
20	Anderfrogle	B	CWA, WQ
21	Anderson	B	LE, WQ
22	Anderson	M	LE, WQ
23	Anderson	S	LE, SC
24	Anderson	C	CWA, WQ
25	Anderson	B	SS, WQ
26	Anderson	K	SS, WQ
27	Anderson	M	CWA, WQ
28	Andrew	G	LE, WQ
29	Andrews	C	SS, WQ
30	Anthony	S	LE, SC
31	Arapoudis	S	LE, SC
32	Arreola	B	SS, WQ
33	Ashby	S	SS, WQ
34	Ashton	R	LE, WQ
35	Ater	D	LE, SC
36	Atkins	M	SS, WQ
37	Austin	R	LE, SC
38	Austin	N	CWA, WQ
39	Aversano	A	LE, SC
40	Avery	C	CWA, WQ
41	Ayers	J	SS, WQ
42	B	A	LE, SC
43	B	J	LE, SC
44	Bach	L	LE, SC
45	Back	F	SS, WQ
46	Bailey	M	LE, WQ
47	Bakas	D	SS, WQ
48	Bakatsias	P	SS, WQ
49	Baker	L	CWA, LE, WQ, Other(1)
50	Baker	J	LE, SC
51	Baker	D	CWA, WQ
52	Ballard	M	LE, SC
53	Ballard	K	LE, SC
54	Baran	B	LE, SC
55	Barber	T	LE, WQ
56	Barber	W	CWA, WQ
57	Barber	J	CWA, WQ
58	Barber	J	CWA, WQ
59	Baregrounds	O	SS, WQ
60	Barker	L	LE, SC, WQ
61	Barker	L	SS, WQ
62	Barnes	K	LE, WQ
63	Barnes	R	LE, WQ
64	Barnett	B	LE, WQ
65	Barnett	B	LE, WQ
66	Barnett	B	LE, SC
67	Baron	T	SS, WQ
68	Barrow	C	LE, WQ
69	Bartley	A	SS, WQ
70	Baschon	P	SS, WQ
71	Bason	D	CWA, WQ
72	Bass	W	LE, WQ
73	Bassett	S	LE, WQ
74	Bauerband	G	CWA, WQ
75	Baumgardner	K	LE, SC
76	Beach	B	LE, WQ
77	Beam	D	SS, WQ
78	Bearden	K	LE, WQ
79	Bearden	J	LE, SC
80	Bearman	K	SS, WQ
81	Beaudry	S	LE, SC
82	Becker	H	SS, WQ
83	Beech	J	CWA, WQ
84	Beeman	E	LE, WQ
85	Belanger	M	LE, WQ
86	Belcher	A	LE, SC
87	Belknap	B	CWA, WQ
88	Belknap	R	SS, WQ
89	Bentley	C	LE, WQ
90	Bentley	M	SS, WQ
91	Berg	C	CWA, WQ
92	Bergmueller	R	LE, WQ
93	Berry	A	CWA, SC, WQ
94	Berry	S	CWA, WQ
95	Bethune	K	LE, WQ
96	Bethune	K	LE, WQ
97	Bickel	B	LE, WQ
98	Bier	L	LE, SC
99	Birckhead	P	CWA, SS, WQ
100	Bishop	M	LE, SC
101	Bishop	A	CWA, WQ
102	Bivins	L	SS, WQ
103	Bixiones	B	CWA, WQ
104	Blacknight	B	SS, WQ
105	Blaine	W	CWA, LE, SC
106	Blakely	R	CWA, WQ
107	Blanton	T	SS, WQ
108	Blasdell	P	LE, WQ
109	Bledsoe	D	LE, SC
110	Blue	M	SS, WQ
111	Blunier	T	SS, WQ
112	Bobrowski	K	SS, WQ
113	Bodsford	J	LE, SC
114	Bogaert	A	CWA, WQ
115	Bogdan	E	CWA, WQ
116	Bogren	D	SS, WQ
117	Boinodiris	S	LE, WQ
118	Bolduc	M	CWA, WQ
119	Boletchek	S	LE, WQ
120	Boll	P	LE, WQ
121	Bollini	M	LE, SC
122	Bonin	B	CWA, WQ
123	Booth	L	CWA, WQ
124	Bostic	M	SS, WQ
125	Bottesch	S	LE, WQ
126	Boulais	K	Other(2)
127	Bowen	D	LE, WQ
128	Bowers	J	LE, WQ
129	Bowers	H	LE, SC
130	Bowling	M	CWA, WQ
131	Bowman	L	LE, SC
132	Boyce	E	LE, WQ
133	Boyd	J	CWA, WQ
134	Boyd	T	CWA, WQ
135	Bradshaw	T	LE, SC
136	Braswell	A	SS, WQ
137	Braswell	N	CWA, WQ
138	Bratton	T	LE, SC
139	Brawley	S	LE, WQ
140	Brazzel	D	SS, WQ
141	Breckenridge	J	LE, WQ
142	Brennan	A	SS, WQ
143	Brennen	K	SS, WQ
144	Brewer	S	LE, WQ
145	Brewer	A	SS, WQ
146	Brezina	I	CWA, WQ
147	Bricic	J	LE, WQ
148	Brickett	D	SS, WQ
149	Brickner	P	LE, SC
150	Bridenbaugh	D	LE, WQ
151	Bridges	J	LE, WQ
152	Brimm	M	LE, SC
153	Brinin	S	LE, SC
154	Briton	R	LE, SC
155	Britt-Moore	L	CWA, WQ
156	Brodhag	D	SS, WQ
157	Brody	S	SS, WQ
158	Bronski	J	LE, SC
159	Brooks-Mathers	S	LE, SC
160	Brown	S	LE, SC
161	Brown	W	CWA, WQ
162	Brownstein	E	LE, SC
163	Bruer	J	CWA, WQ
164	Brumbaugh	D	LE, WQ
165	Brummitt-Yale	C	LE, WQ
166	Brunick	J	LE, SC
167	Bryant	C	CWA, WQ
168	Buck	R	LE, WQ
169	Bucklen	S	CWA, WQ
170	Buckner	W	LE, SC
171	Buffet	S	LE, WQ
172	Bullard	E	SS, WQ
173	Bundgaard	S	CWA, WQ
174	Bura	L	LE, SC
175	Burazer	G	LE, WQ
176	Burgess	A	CWA, WQ
177	Burgie	S	LE, WQ
178	Burke	C	CWA, SC, WQ
179	Burkhead	C	LE, SC, SS, WQ
180	Burkhead	R	LE, SC
181	Burleson	L	LE, WQ
182	Burns	B	LE, SC
183	Burns	D	WQ
184	Burroughs	D	SS, WQ
185	Burton	B	LE, WQ
186	Busacco	J	LE, SC
187	Busch	L	LE, WQ
188	Busko	M	LE, WQ
189	Buslot	C	SS, WQ
190	Butler	D	LE, WQ
191	Byrd	A	SS, WQ
192	Byrne	S	CWA, WQ
193	Cabarga	P	SS, WQ
194	Cable	J	CWA, WQ
195	Cada	P	CWA, WQ
196	Cade	R	LE, WQ
197	Cadwalader	R	SS, WQ
198	Cagney	B	LE, SC
199	Cagney	T	SS, WQ
200	Cain	K	CWA, WQ
201	Calad	G	LE, WQ
202	Callis	L	LE, WQ
203	Camp	B	SS, WQ
204	Campbell	D	LE, SC
205	Campbell	B	LE, SC
206	Campbell	D	CWA, WQ
207	Campbell	D	LE, SC
208	Campbell	R	SS, WQ
209	Canty	D	SS, WQ
210	Capshaw	T	LE, WQ

See Appendix B for Comment Responses. Aesthetic Resources (AR) (B.18); Clean Water Act Compliance (CWA) (B.19); Lack of Scientific Evidence (LE) (B.20, B.24); Safety Concerns (SC) (B.21); Preceived Single Source Contract / Preclusion of Additional Alternatives (SS) (B.22); Water Quality (WQ) (B.23, B.24); Wildlife Concerns (WL) (B.25)

Count	Commentor Last Name, Initial		Comment Category (See Appendix B & Note Below)
211	Cardew	A	CWA, WQ
212	Cardoso	T	SS, WQ
213	Cardwell	D	CWA, WQ
214	Carina	R	SS, WQ
215	Carleo	E	LE, SC
216	Carlson	S	LE, SC
217	Carman	I	LE, SC
218	Carmichael	L	LE, WQ
219	Carney	R	SS, WQ
220	Carrigan	S	LE, WQ
221	Carroll	M	CWA, WQ
222	Carson	B	LE, WQ
223	Carter	C	SS, WQ
224	Casey	A	AR, SC, WL, WQ
225	Casteel	J	LE, WQ
226	Castillo	R	LE, WQ
227	Caudell	S	LE, SC
228	Cavalier	C	LE, WQ
229	Cavalluzzi	B	LE, WQ
230	Chachula	J	SS, WQ
231	Chafin	J	SS, WQ
232	Chaksupa	D	CWA, WQ
233	Chamberlain	L	LE, WQ
234	Chamberlain	R	LE, SC
235	Chandler	C	CWA, WQ
236	Chapman	C	LE, SC
237	Chapman	P	CWA, WQ
238	charity	P	CWA, WQ
239	Chasen	A	CWA, WQ
240	Chasteen	B	SS, WQ
241	Cheney	G	LE, WQ
242	Chihill	P	LE, WQ
243	Childers	T	CWA, WQ
244	Chinlund	N	LE, WQ
245	Chiosso	E	CWA, LE, SC, WL, WQ,
246	Chrystal	D	CWA, WQ
247	Clark	K	LE, SC
248	Clark	B	LE, SC
249	Clark	M	SS, WQ
250	Clarke	C	CWA, WQ
251	Clawson	B	SS, WQ
252	Clayton	R	SS, WQ
253	Cleereman	H	CWA, LE, SC, WQ
254	Clemons	L	CWA, WQ
255	Clodfelter	L	LE, SC
256	Clonts	R	SS, WQ
257	Cobb	B	LE, SC
258	Cobeland	A	SS, WQ
259	Coburn	C	SS, WQ
260	Colbert	M	CWA, WQ
261	Coleman	E	LE, WQ
262	Coleman	D	LE, SC
263	Coley	L	SS, WQ
264	Collins	G	LE, SC
265	Compiano	J	CWA, WQ
266	Conceicaeo	A	CWA, WQ
267	Conley	B	LE, WQ
268	Conley	C	LE, WQ
269	Conley	J	LE, SC
270	Conrad	E	LE, SC
271	Constine	M	SS, WQ
272	Conway	C	LE, WQ
273	Cook	D	LE, WQ
274	Cook	D	CWA, WQ
275	Cook	A	SS, WQ
276	Cook-Carlton	L	CWA, WQ
277	Cooke	B	CWA, WQ
278	Cooper	N	LE, WQ
279	Copeland	T	CWA, WQ
280	Coppotelli	H	LE, WQ
281	Cormier	L	SS, WQ
282	Cornwell	G	LE, WQ
283	Cottle	S	LE, SC
284	Courtney	D	CWA, WQ
285	Cousins	S	SS, WQ
286	Covington	L	LE, WQ
287	Cox	L	LE, SC, WQ
288	Crabill	P	LE, WQ
289	Crabtree	D	SS, WQ
290	Crawford	C	LE, WQ
291	Crawshaw	P	LE, WQ
292	Creasman	R	CWA, WQ
293	Crews	K	LE, WQ
294	Crews	M	SS, WQ
295	Cross	W	CWA, WQ
296	Crotty	J	CWA, WQ
297	Crow	P	WQ
298	Crumley	C	LE, WQ
299	Cruz-Odoherty	V	SS, WQ
300	Csapo	I	LE, WQ
301	Csensick	J	CWA, WQ
302	Cullen	P	SS, WQ
303	Culp	P	CWA, WQ
304	Cummings	H	SS, WQ
305	Cummings	S	CWA, WQ
306	Cunningham-	P	LE, WQ
307	Curlin	B	LE, SC
308	Curry	R	SS, WQ
309	Curtis	E	SS, WQ
310	Czerniak	A	SS, WQ
311	Dailey	P	CWA, WQ
312	Dain	W	CWA, WQ
313	Dainotto	J	SS, WQ
314	Dale	E	LE, SC
315	Daley	L	SS, WQ
316	Dalton	M	SS, WQ
317	Damrel	E	CWA, WQ
318	Danahy	D	SS, WQ
319	Daniel	M	LE, SC
320	Daniel	P	WQ
321	Daniels	G	CWA, WQ
322	Darling	R	CWA, WQ
323	Dash	A	SS, WQ
324	Daubenspeck	M	CWA, LE, SC
325	David	T	LE, WQ
326	Davidson	J	SS, WQ
327	Davis	C	LE, WQ
328	Davis	D	LE, SC
329	Davis	J	SS, WQ
330	Davis	S	CWA, WQ
331	Davis, Jr.	W	LE, SC
332	Dayer	A	LE, WQ
333	Deardorff	D	SS, WQ
334	Debandi	G	LE, WQ
335	DeCristofaro	J	SS, WQ
336	Dehon-Adams	M	CWA, WQ
337	Deibert	T	CWA, WQ
338	DeLaney	S	SS, WQ
339	Delavan	A	LE, WQ
340	DelGarbino	A	CWA, WQ
341	DeLuca	J	LE, WQ
342	Dennis	F	LE, SC
343	D'Ercole	V	CWA, WQ
344	Derrickson	R	LE, SC
345	Desjardins	J	LE, SC
346	Dessent	M	LE, WQ
347	Devine	J	SS, WQ
348	Diana	M	SS, WQ
349	Diaz	L	LE, WQ
350	Dienemann	J	SS, WQ
351	Dietrich	W	SS, WQ
352	Diliberto	P	LE, SC
353	Dillard	G	SS, WQ
354	Dillon-Gehrig	S	LE, WQ
355	DiMarco	J	LE, SC
356	Dittmann	K	LE, WQ
357	Dittmer	J	CWA, WQ
358	Dobson	C	LE, SC
359	Doherty	T	SS, WQ
360	Domanski	C	SS, WQ
361	Donaldson	D	LE, SC
362	Donk	J	SS, WQ
363	Dore	K	LE, SC
364	Dornback	M	LE, SC
365	Dossett	W	LE, SC
366	Downs	C	SS, WQ
367	Drake	M	LE, WQ
368	Drake	D	CWA, WQ
369	Draper	R	CWA, WQ
370	Driscoll	V	LE, SC
371	Duffy	R	LE, WQ
372	Dunn	C	CWA, WQ
373	Dupre	C	SS, WQ
374	Dye	T	SS, WQ
375	Dye	J	CWA, WQ
376	Eagle	C	LE, SC
377	East	L	LE, SC
378	Eastbrooks	A	LE, SC
379	Edds	W	LE, SC
380	Edwards	S	SS, WQ
381	Egloff	F	LE, SC
382	Elliott	D	LE, SC
383	Englebourg	E	CWA, WQ
384	English	S	SS, WQ
385	Ensign	R	CWA, WQ
386	Erickson	R	SS, WQ
387	Ertischek	R	CWA, WQ
388	Ervin	D	LE, SC
389	Estes	F	SS, WQ
390	Eubanks	M	LE, SC
391	Evans	D	LE, WQ
392	Evans	J	SS, WQ
393	Everett	J	CWA, WQ
394	Everett	E	CWA, WQ
395	Evon	M	SS, WQ
396	Fairall	D	SS, WQ
397	Falk	S	CWA, WQ
398	Fallon	E	LE, SC
399	Farley	C	LE, SC
400	Farlow	J	LE, SC
401	Farnsworth	W	LE, WQ
402	Farouqi	N	LE, SC
403	Farrington	J	LE, SC
404	Feinstein	M	SS, WQ
405	Feldkamp	S	LE, WQ
406	Feldman	T	CWA, WQ
407	Felty	E	CWA, WQ
408	Feng	K	LE, SC
409	Fenley	B	SS, WQ
410	Fenn	K	LE, SC
411	Fernandez	L	SS, WQ
412	Ferrin	M	LE, SC
413	Fiegl	R	SS, WQ
414	Fields	M	LE, SC
415	Fish	V	LE, WQ
416	Fisher	R	LE, SC
417	Fisher	L	SS, WQ
418	Fishman	T	SS, WQ
419	Fisk	W	CWA, WQ
420	Fitzpatrick	L	LE, WQ

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Count	Commentor Last Name, Initial		Comment Category (See Appendix B & Note Below)
421	Flake	E	LE, SC
422	Fletcher	C	LE, WQ
423	Flickinger	A	LE, SC
424	Flora	D	SS, WQ
425	Flowers	J	LE, WQ
426	Flowers	H	SS, WQ
427	Floyd	A	CWA, WQ
428	Forbes	J	LE, SS, WQ
429	Ford	J	CWA, WQ
430	Forrest	A	LE, WQ
431	Forsyth	D	CWA, WQ
432	Fortenberry	D	LE, SC
433	Fouche	D	LE, SC
434	Fouts	S	CWA, WQ
435	Fowler	D	CWA, WQ
436	Fox	T	LE, WQ
437	Fox	R	SS, WQ
438	Franklin	S	LE, WQ
439	Frankllin	J	LE, SC
440	Fraytet	J	LE, WQ
441	Frazer	T	LE, WQ
442	Freeze	J	SS, WQ
443	Fregeau	D	LE, SC
444	Frei	J	LE, SC
445	Friedman	F	LE, SC
446	Frisbey	P	SS, WQ
447	Froelich	C	LE, SC
448	Fullam	W	SS, WQ
449	Furr	K	CWA, WQ
450	Gage	F	LE, WQ
451	Gage	H	LE, SC
452	Galbrecht	S	LE, SC
453	Gale	K	CWA, WQ
454	Gallagher	N	LE, WQ
455	Gallagher	E	LE, WQ
456	Gallagher	M	LE, WQ
457	Gallavan-Orris	M	LE, WQ
458	Gans	F	CWA, WQ
459	Garabedian	L	LE, WQ
460	Gardener	D	SS, WQ
461	Gardiner	S	LE, SC
462	Gardner	D	LE, WQ
463	Garvett	E	CWA, WQ
464	Garvey	L	LE, SC
465	Gash	D	LE, SC
466	Gedney	K	LE, SC, WQ
467	Gedney	H	CWA, WQ
468	Gelblum	R	LE, WQ
469	Gellar	M	LE, WQ
470	George	D	CWA, WQ
471	George	J	CWA, WQ
472	Gerard	D	LE, WQ
473	Ghelfi	L	SS, WQ
474	Giddings	A	CWA, WQ
475	Gillen	C	LE, SC
476	Gillette	S	CWA, WQ
477	Gilliam	L	LE, WQ
478	Gingrich	T	CWA, WQ
479	Gipko	R	CWA, WQ
480	Gipson	C	CWA, WQ
481	Girolami	M	LE, SC, WL, WQ
482	Gister	R	LE, SC
483	Glenn	K	LE, WQ
484	Glover	L	SS, WQ
485	Glover	S	CWA, WQ
486	Goddin	W	CWA, WQ
487	Godfrey	R	LE, SC
488	Godwin	D	SS, WQ
489	Goff	N	CWA, WQ
490	Goldenthal	J	LE, WQ
491	Gonzalez	M	LE, SC
492	Goodkind	M	SS, WQ
493	Goodwin	D	SS, WQ
494	Gordon	E	SS, WQ
495	Gore	M	SS, WQ
496	Goshaw	A	LE, SC, WQ
497	Goshaw	J	LE, SC
498	Govus	G	LE, SC, WQ
499	Grace	J	LE, WQ
500	Graham	M	LE, SC
501	Graham	D	SS, WQ
502	Graham	D	CWA, WQ
503	GrahamDanG	D	LE, SC
504	Granda	B	LE, SC
505	Grant	P	LE, SC
506	Grater	J	CWA, WQ
507	Grau	R	CWA, WQ
508	Green	K	CWA, WQ
509	Green	A	SS, WQ
510	Greene	B	SS, WQ
511	Greenwood	N	LE, WQ
512	Gregor	J	CWA, WQ
513	Grier	B	CWA, WQ
514	Griffin	M	LE, WQ
515	Griffith	N	SS, WQ
516	Grossberg	D	CWA, WQ
517	Grosser	S	SS, WQ
518	Grotegut	K	SS, WQ
519	Groves	B	LE, WQ
520	Grubbs	N	LE, SC
521	Gruber	K	LE, SC
522	Gu	M	CWA, WQ
523	Gupton	W	SS, WQ
524	Gurrala	D	LE, SC
525	Gustafson	N	LE, WQ
526	Guthrie	E	LE, WQ
527	Gutierriez	B	LE, SC
528	Gwyn	B	LE, WQ
529	Haappala	A	LE, SC
530	Haddad	M	SS, WQ
531	Hagewood	R	LE, SC
532	Haig	C	CWA, WQ
533	Hakkila, Sr	R	LE, WQ
534	Haladay	J	SS, WQ
535	Halas	M	CWA
536	Hale	W	SS, WQ
537	Hall	C	SS, WQ
538	Hall	C	CWA, WQ
539	Hall	L	CWA, LE, SC, WQ
540	Hallacy	D	SS, WQ
541	Halsted	S	SS, WQ
542	Hamann	D	LE, WQ
543	Hamby	G	CWA, WQ
544	Hamer	M	CWA, WQ
545	Hamilton	R	LE, WQ
546	Hampton	B	LE, SC
547	Hanes	M	CWA, WQ
548	Hannon	L	LE, SC
549	Hardee	A	SS, WQ
550	Hardin	J	LE, SC
551	Haresch	J	LE, WQ
552	Harmon	S	LE, WQ
553	Harper	J	SS, WQ
554	Harris	J	CWA, WQ
555	Harris	T	SS, WQ
556	Harris	M	WQ
557	Harrison	W	LE, SC
558	Harrison	D	LE, SC
559	Hart	K	CWA, WQ
560	Hartman	J	CWA, WQ
561	Hartzog	A	LE, WQ
562	Harvey	B	LE, WQ
563	Hassell	A	SS, WQ
564	Hastings	T	LE, WQ
565	Hastings	M	CWA, WQ
566	Hatton	M	LE, SC
567	Hawkins	J	LE, WQ
568	Hawkins	P	LE, SC
569	Hawley	D	LE, WQ
570	Haworth	M	LE, WQ
571	Hay	C	SS, WQ
572	Hay	S	SS, WQ
573	Hayne	L	LE, SC
574	Haywood	J	LE, WQ
575	Haywood	J	LE, WQ
576	Haywood	D	CWA, WQ
577	Hazeltine	M	SS, WQ
578	Hazelton	J	LE, SC
579	Hazlett	T	CWA, WQ
580	Heady	C	LE, WQ
581	Hearn	N	LE, WQ
582	Heaton	S	LE, WQ
583	Hedin	R	CWA, SS, WQ
584	Heiks	K	LE, SC
585	Heironimus	J	LE, WQ
586	Hemby	J	SS, WQ
587	Henderson	D	SS, WQ
588	Henley	J	CWA, WQ
589	Hennessy	C	CWA, WQ
590	Henry	A	SS, WQ
591	Henson	V	SS, WQ
592	Hepler	G	LE, WQ
593	Herman	R	LE, WL, WQ
594	Herman	M	CWA, WQ
595	Herring	V	CWA, WQ
596	Herzog	M	LE, SC
597	Hess	K	LE, WQ
598	Hester	J	LE, WQ
599	Hester	F	LE, SC
600	Hetman	M	SS, WQ
601	Hibbard	J	LE, WQ
602	Hicks	R	CWA, WQ
603	Higgins	T	SS, WQ
604	Highfill	H	SC, WQ
605	Hindman	S	SS, WQ
606	Hindson	J	SS, WQ
607	Hines	B	LE, SC
608	Hines	V	SS, WQ
609	Hix	S	CWA, WQ
610	Hoback	S	LE, SC
611	Hobson	J	LE, WQ
612	Hoke	C	LE, WQ
613	Holder	E	LE, WQ
614	Holland	J	CWA, WQ
615	Hollifield	G	SS, WQ
616	Holsten	B	LE, WQ
617	Hoots	W	SS, WQ
618	Hopkins	J	LE, SC
619	Hopman	T	LE, SC
620	Hopson	K	CWA, WQ
621	Horn	M	CWA, WQ
622	Hornaday	N	SS, WQ
623	Horne	M	LE, SC
624	Horne	S	CWA, WQ
625	Horne	M	SS, WQ
626	Horne	W	SS, WQ
627	Horton	F	LE, SC
628	House	H	CWA, WQ
629	Houston	A	CWA, WQ
630	Howard	G	CWA, WQ

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Count	Commentor Last Name, Initial		Comment Category (See Appendix B & Note Below)
631	Howard	D	CWA, WQ
632	Howe	I	CWA, WQ
633	Hoyt	E	SS, WQ
634	Hudson	J	LE, WQ
635	Huffman	F	LE, WQ
636	Hughes	C	LE, WQ
637	Huiber	K	LE, SC, WQ
638	Hulslander	M	LE, SC
639	Hunter	V	CWA, WQ
640	Hustvedt	C	CWA, WQ
641	Hydaker	J	LE, SC
642	Iannetta	B	LE, WQ,
643	Iery	D	CWA, WQ
644	Iery	G	LE, WQ
645	Iery	B	LE, SC
646	Infante	N	CWA, WQ
647	Irmiter	K	SS, WQ
648	Israel	K	LE, WQ
649	Ivy	E	SS, WQ
650	Jackson	T	LE, WQ
651	Jackson	P	LE, SC
652	Jackson	B	CWA, WQ
653	Jacob	P	LE, WQ
654	Jacob	J	LE, WQ
655	Jacobs	G	LE, SC
656	Jacoby	L	LE, SC
657	Jagdmann	S	SS, WQ
658	Jean	P	CWA, WQ
659	Jenkins	J	LE, SC
660	Jensen	B	WQ
661	Jeroloman	A	LE, SC
662	Jester	B	CWA, WQ
663	Jezierski	E	LE, WQ
664	Johnson	T	LE, WQ
665	Johnson	P	LE, WQ
666	Johnson	M	CWA, WQ
667	Johnson	B	SS, WQ
668	Johnson	D	SS, WQ
669	Johnson	A	SS, WQ
670	Jones	J	LE, WQ
671	Jones	A	LE, SC
672	Jones	T	SS, WQ
673	Jones	E	SS, WQ
674	Jones	A	SS, WQ
675	Jones	K	CWA, WQ
676	Jordan	D	LE, WQ
677	Jordan	K	LE, SC
678	Jorgenson	R	SS, WQ
679	Joslin	M	LE, SC
680	Joyner	J	SS, WQ
681	Jung	S	CWA, WQ
682	Juntilla	K	CWA, WQ
683	Justice	B	LE, WQ
684	Kahn	L	CWA, WQ
685	Kammermeyer	J	LE, WQ
686	Kannon	T	CWA, WQ
687	Kantor	J	LE, WQ
688	Kapetsky	E	LE, SC
689	Kaplan	C	LE, WQ
690	Kaplan	A	SS, WQ
691	Karnecki	T	CWA, WQ
692	Karr	D	CWA, WQ
693	Kartiganer	E	SS, WQ
694	Kearney	J	CWA, WQ
695	Keech	M	LE, WQ
696	Keegan	J	LE, WQ
697	Kelleher	J	SS, WQ
698	Keller	R	CWA, WQ
699	Kelley	J	CWA, WQ
700	Kelly	B	LE, SS, WQ
701	Kelly	N	LE, SC
702	Kelly	C	CWA, WQ
703	Kemper	T	LE, SC
704	Kenny	S	SS, WQ
705	Kensicki	E	CWA, WQ
706	Kent	E	SS, WQ
707	Keppler	D	CWA, WQ
708	Kerr	C	LE, WQ
709	Ketchum	L	CWA, WQ
710	Key	V	LE, WQ
711	Khalsa	K	LE, SC
712	Khoury, MD	A	CWA, WQ
713	Kidder	C	SS, WQ
714	Kilarski	S	LE, SC
715	Kim	N	SS, WQ
716	King	D	CWA, WQ
717	Kingsbury	P	CWA, WQ
718	Kinney	A	LE, SC
719	Kinney	M	CWA, WQ
720	Kinsella	J	LE, WQ
721	Kirby	T	LE, SC
722	Kirchhoff	M	CWA, WQ
723	Kirk-Conrad	T	CWA, WQ
724	Kirkman	J	LE, SC
725	Kirkpatrick	T	CWA, WQ
726	Kistler	J	SS, WQ
727	Klauda	H	SS, WQ
728	Kleaveland	J	CWA, SC, WQ
729	Klein	G	SS, WQ
730	Klinesmith	W	CWA, WQ
731	Knop	C	SS, WQ
732	Knotts	R	LE, SC
733	Knuth	M	LE, WQ
734	Koester	W	LE, SC
735	Konas	D	LE, WQ
736	Konzelman	D	SS, WQ
737	Kopack	J	SS, WQ
738	Koppel	J	LE, SC
739	Koren	E	SS, WQ
740	Korman	A	LE, SC
741	Kotiw	K	LE, SC
742	Kratzer	J	SS, WQ
743	Kraus	S	LE, SC
744	Krause	D	LE, WQ
745	Kuchik	B	LE, WQ
746	Kutchera	K	LE, SC
747	La Motte	D	WQ
748	Lacki	I	LE, SC
749	Lahey	T	LE, WQ
750	Lamb	T	CWA, WQ
751	Landstrom	P	LE, SC
752	Lange	E	SS, WQ
753	Langworth	R	CWA, WQ
754	Lanzen	A	LE, SC
755	Lapas	D	LE, WQ
756	Laprade	B	CWA, WQ
757	Larivee	C	SS, WQ
758	Laste	M	CWA, WQ
759	LaStella	J	SS, WQ
760	Lausch	J	SS, WQ
761	LaVack	D	WQ
762	Lavau	C	CWA, WQ
763	Lawrence	B	LE, WQ
764	Laws	K	SS, WQ
765	Leary	K	LE, WQ
766	Lee	M	LE, WQ
767	Lee	H	LE, WQ
768	Leech	W	LE, SC
769	Leeper	S	LE, WQ
770	Lefler	T	CWA, WQ
771	Leighton	T	SS, WQ
772	Leonard	T	LE, SC
773	Lester	P	LE, SC
774	Levandoski	M	CWA, LE, SC
775	Levene	K	LE, WQ
776	Levesque	A	LE, SC
777	Lincoln	T	LE, WQ
778	Linden	S	LE, WQ
779	Lindsay	A	LE, WQ
780	Lines	D	SS, WQ
781	Linhart	J	LE, SC
782	Linquist	S	LE, WQ
783	Liske	S	LE, WQ
784	Liske	S	LE, WQ
785	Little	J	LE
786	Little	A	SS, WQ
787	Little	J	LE, WQ
788	Livingston	H	WQ
789	Livingston	H	WQ
790	Lizer	D	LE, SC
791	Llewellyn	C	SS, WQ
792	Lloyd	G	LE, WQ
793	Lockhart	E	SS, WQ
794	Locklear	C	CWA, WQ
795	Locklier	K	LE, SC, WQ
796	Lockshier	A	SS, WQ
797	Lohry	C	CWA, WQ
798	London	J	LE, WQ
799	Long	D	SS, WQ
800	Longo	G	CWA, WQ
801	Lorah	B	SS, WQ
802	Lorch	F	LE, WQ
803	Lotspeich	E	LE, WQ
804	Loughran	C	SS, WQ
805	Lovejoy	J	SS, WQ
806	Lovejoy	J	LE, WQ
807	Lowndes	C	LE, WQ
808	Lubinski	S	LE, SC
809	Lucas	M	LE, WL, WQ
810	Lucas	M	LE, SC
811	Lucas	S	CWA, WQ
812	Lux	T	LE, WQ
813	Luxton	T	LE, SC
814	Lyon	R	LE, SC
815	Lyons	P	LE, WQ
816	Lyons	W	SS, WQ
817	MacCrerry	N	LE, SC, WQ
818	Macomber	B	LE, SC
819	Maddocks	A	SS, WQ
820	Maddy	L	LE, WQ
821	Magee	J	LE, SC
822	Maiers	H	CWA, WQ
823	Malone	R	SS, WQ
824	Manar	N	CWA, WQ
825	Margo	L	LE, WQ
826	Marhevsky	A	LE, SC
827	Marlowe	C	CWA, WQ
828	Marrs	R	LE, SC
829	Marsh	C	CWA, WQ
830	Marshall	B	LE, SC
831	Martin	L	LE, WQ
832	Martin	K	LE, WQ
833	Martin	J	LE, WQ
834	Martin	D	CWA, WQ
835	Martin	K	CWA, WQ
836	Martin	M	CWA, WQ
837	Martin	M	SS, WQ
838	Marty	D	LE, WQ
839	Massey	T	CWA, WQ
840	Mather	S	SS, WQ

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Count	Commentor Last Name, Initial		Comment Category (See Appendix B & Note Below)
841	Mauney	H	LE, WQ
842	Mauney	K	LE, WQ
843	Maynard	L	CWA, WQ
844	McArthur-Wicks	D	CWA, WQ
845	McCabe	J	SS, WQ
846	McCann	J	CWA, WQ
847	McCarson	T	LE, WQ
848	McClanahan	S	CWA, WQ
849	McClure	D	LE, WQ
850	McCown	S	CWA, WQ
851	McCracken	P	LE, SC, WQ
852	McCracken	P	LE, SC
853	McCrary	R	CWA, WQ
854	McCroskey	C	CWA, WQ
855	McCuen, Jr.	L	LE, SC
856	Mcculloch	M	LE, SC
857	McCurry	R	LE, WQ
858	McDaniel	S	LE, WQ
859	McDaniel, Jr	D	LE, WQ
860	Mcdiarmid	M	CWA, WQ
861	McElhaney	M	LE, WQ
862	McGahey	R	CWA, WQ
863	McGlauffin	M	LE, WQ
864	McGlynn	L	SS, WQ
865	McGratty	C	SS, WQ
866	Mcgratty	J	CWA, WQ
867	McGraw	T	SS, WQ
868	McGraw	C	SS, WQ
869	Mchone	L	CWA, WQ
870	McIntyre	A	CWA, WQ
871	McIrvin	R	LE, SC
872	McKee	K	LE, WQ
873	McKelvey	D	CWA, WQ
874	Mcleod	A	SS, WQ
875	Mclintock	D	LE, WQ
876	McMakin	M	LE, WL, WQ
877	McManus	A	CWA, WQ
878	McNally	R	CWA, WQ
879	McQueen	S	LE, SC
880	McRae	L	CWA, WQ
881	McVay	M	LE, WQ
882	McWhorter	E	SS, WQ
883	McWilliam	N	SS, WQ, LE
884	Meagher	C	LE, WQ
885	Mebane	J	LE, SC
886	Medlin	A	CWA, WQ
887	Medoff	G	CWA, WQ
888	Megill	E	LE, SC
889	Meiners	M	LE, SC
890	Melerski	J	SS, WQ
891	Meltsner	D	LE, SC
892	Mencho	L	LE, SC
893	Mendell	S	CWA, WQ
894	Merrill	L	LE, SC
895	Merris	S	LE, SC
896	Messina	L	LE, SS, WQ
897	Meyer	T	LE, SC
898	Meyer	S	CWA, WQ
899	Meyerson	D	CWA, WQ
900	Mezynski	E	LE, SC
901	Michelson	D	CWA, WQ
902	Miller	R	LE, WQ
903	Miller	A	LE, SC
904	Miller	J	SS, WQ
905	Miller	S	SS, WQ
906	Mills	A	LE, SC
907	Minges	E	LE, SC
908	Mitchell	M	LE, WQ
909	Mitchell	C	CWA, WQ
910	Mitchell	M	CWA, WQ
911	Mode	H	LE, WQ
912	Moffitt	B	LE, SC
913	Moh	G	LE, SC
914	Moldovan	R	LE, SC
915	Moldoveanu	C	LE, SC
916	Moloney	P	SS, WQ
917	Montgomery	N	SS, WQ
918	Moon	I	LE, SC
919	Moore	E	LE, WQ
920	Moore	J	LE, WQ
921	Moore	E	SS, WQ
922	Moore	R	SS, WQ
923	Mora	S	SS, WQ
924	Morales	R	LE, SC
925	Moran	J	CWA, WQ
926	Morance	S	SS, WQ
927	Morgan	D	LE, WQ
928	Morgan	M	CWA, WQ
929	Morringello	G	LE, WQ
930	Morris	S	LE, SC
931	Morris	L	CWA, WQ
932	Morris	S	SS, WQ
933	Morton	C	CWA, WQ
934	Moseley	J	LE, SC
935	Motley-Pearson	T	LE, WQ
936	Moulin	M	CWA, WQ
937	Mowrey	G	LE, WQ
938	Moxley	R	WQ
939	Moyer	H	SS, WQ
940	Mueller	H	LE, SC
941	Mueller	N	LE, SC
942	Mullis	R	LE, WQ
943	Mundie	D	LE, SC
944	Muntner	L	LE, SC
945	Murchison	M	LE, SC
946	Murningham	P	SS, WQ
947	Murphy	E	LE, WQ
948	Murphy	D	LE, SC
949	Murphy	K	LE, WQ
950	Myers	B	LE, WQ
951	Myers	J	SS, WQ
952	Nance	K	CWA, WQ
953	Napoli	M	WQ
954	Napoli	J	LE, WQ
955	Naujoks	D	CWA, LE, WQ
956	Neal	P	SS, WQ
957	Neddermeyer	M	LE, WQ
958	Nehlsen	K	SS, WQ
959	Nelson	R	LE, WQ
960	Newhard	J	LE, SC
961	Nichols	W	CWA, WQ
962	Nicholson	C	SS, WQ
963	Nieman	C	LE, SC
964	Niemchak	M	CWA, WQ
965	Nieters	L	LE, WQ
966	Nikkel	D	LE, WQ
967	Nitkin	N	LE, WQ
968	Nitsch	C	SS, WQ
969	Nolan	D	LE, WQ
970	Nolan	M	CWA, WQ
971	Nordhorn	M	SS, WQ
972	Norton	H	LE, WQ
973	Norton	M	CWA, WQ
974	Nothdurft	A	LE, WQ
975	Novak	T	LE, SC
976	Noyes	A	LE
977	Oakley	B	SS, WQ
978	Oakley	C	CWA, WQ
979	Oara	H	CWA, WQ
980	Obeid	R	SS, WQ
981	Oberst	D	CWA, WQ
982	O'Brien	D	CWA, WQ
983	O'Buckley	T	SS, WQ
984	Ocasio	M	CWA, WQ
985	O'Connell	M	CWA, WQ
986	O'Connor	J	SS, WQ
987	Odei-Larbi	E	CWA, WQ
988	O'Donnell	K	SS, WQ
989	Oehler	S	LE, WQ
990	Oehler	C	CWA, LE, WQ
991	Offen	P	LE, SC
992	O'Kane	K	SS, WQ
993	Oliver	W	SS, WQ
994	Olk	L	LE, SC
995	Olley	L	LE, SC
996	Olson	C	Other(3)
997	Olson	S	SS, WQ
998	O'Neal	A	LE, SC, SS, WL, WQ
999	O'Neal	M	SS, WQ
1000	Oppelt	T	CWA, WQ
1001	Oquinn	A	SS, WQ
1002	Ore	Y	SS, WQ
1003	Orr	L	CWA, WQ
1004	Osborne	D	LE, WQ
1005	Osinski	J	CWA, WQ
1006	Otten	M	LE, WQ
1007	Oury	S	See B.19
1008	Outland	R	LE, SC
1009	Owens	D	CWA, WQ
1010	Oyler	M	CWA, WQ
1011	Packman	Z	LE, SC
1012	Padilla	P	SS, WQ
1013	Pait	B	CWA, WQ
1014	Palacky	T	SS, WQ
1015	Palmer	H	SS, WQ
1016	Pannullo	L	LE, SC
1017	Paradise	B	LE, WQ
1018	Pardue	L	SS, WQ
1019	Parham	A	LE, SC
1020	Parker	T	LE, WQ
1021	Parker	J	LE, SC
1022	Parker	D	LE, SC
1023	Parker	K	CWA, WQ
1024	Parkinson	L	SS, WQ
1025	Parris	M	SS, WQ
1026	Parsons	B	LE, WQ
1027	Partridge	H	LE
1028	Pather	R	CWA, WQ
1029	Patterson	A	CWA, WQ
1030	Paul	L	LE, WQ
1031	Paxson	C	SS, WQ
1032	Payne	J	LE, WQ
1033	Payne	H	CWA, WQ
1034	Pearce	B	LE, WQ
1035	Pearce	N	CWA, WQ
1036	Pearsall	K	LE, WQ
1037	Pearson	T	CWA, WQ
1038	Pearson	B	SS, WQ
1039	Peeples	M	CWA, WQ
1040	Pelletier	W	LE, SC
1041	Peltier	B	LE, SC
1042	Pendergast	M	LE, WQ
1043	Penninger	V	CWA, WQ
1044	Perry	C	SS, WQ
1045	Perry	S	CWA, WQ
1046	Peters	S	SS, WQ
1047	Petersen	P	CWA, LE, WQ
1048	Peterson	J	LE, WQ
1049	Phair	K	CWA, WQ
1050	Philips	J	SS, WQ

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Count	Commentor Last Name, Initial		Comment Category (See Appendix B & Note Below)
1051	Philips	J	SS, WQ
1052	Phillippi	S	LE, WQ
1053	Phillips	G	LE, WQ
1054	Phillips	J	LE, WQ
1055	Phoenix	J	LE, SC, WQ
1056	Pietrosemoli	S	LE, WQ
1057	Pilutti	J	CWA, WQ
1058	Pinder	P	LE, WQ
1059	Pinner	B	CWA, WQ
1060	Pinque	M	LE, SC
1061	Plaut	T	CWA, WQ
1062	Plummer	S	LE, SC, WQ
1063	Poliquin	J	CWA, WQ
1064	Polk	A	CWA, WQ
1065	Polk	K	CWA, WQ
1066	Pomponi	J	LE, WQ
1067	Pope	C	LE, WQ
1068	Pope	M	LE, WQ
1069	Pope	S	LE, SC
1070	Porter	M	LE, WQ
1071	Powell	E	SS, WQ
1072	Powers	R	CWA, WQ
1073	Prata	B	SS, WQ
1074	Pratto	M	SS, WQ
1075	Prelesnik	D	CWA, WQ
1076	Presson	G	LE, WQ
1077	Prevette	J	SS, WQ
1078	Price	Z	LE, WQ
1079	Price	J	CWA, WQ
1080	Price	M	SS, WQ
1081	Pritchett	K	SS, WQ
1082	Priuitt	D	LE, WQ
1083	Pruitt	D	LE, WQ
1084	Pugh	J	CWA, WQ
1085	Purcell	B	LE, WQ
1086	Pusel	J	LE, SC
1087	Rabeler	V	LE, SC
1088	Racer	A	LE, WQ
1089	Radigan	B	CWA, WQ
1090	Rakouskas	M	SS, WQ
1091	Ramm	M	CWA, WQ
1092	Rand	S	SS, WQ
1093	Raney	M	LE, WQ
1094	Raya	O	SS, WQ
1095	Raymond	D	LE, WQ
1096	Rector	G	LE, SC, WQ,CWA
1097	Reed	S	LE, SC
1098	Reed	C	CWA, WQ
1099	Register	S	LE, SC
1100	Reilich	S	CWA, WQ
1101	Renz	S	LE, WQ
1102	Resner	S	CWA, WQ
1103	Reuning	S	LE, WQ
1104	Revilla	O	LE, SC
1105	Rich	D	SS, WQ
1106	Richards	E	LE, SC
1107	Richardson	D	CWA, WQ
1108	Richardson	W	CWA, WQ
1109	Richkus	J	CWA, WQ
1110	Richmond	H	SS, WQ
1111	Riddle	E	LE, SC
1112	Rieger	L	LE, SC
1113	Riggins	T	LE, WQ
1114	Riverwind	A	LE, WQ
1115	Roberts	R	LE, WQ
1116	Roberts	S	LE, WQ
1117	Roberts	T	LE, WQ
1118	Roberts	S	LE, SC
1119	Roberts	J	SS, WQ
1120	Robertson	D	LE, WQ
1121	Robertson	B	LE, SC, CWA
1122	Robertson	K	SS, WQ
1123	Robin	W	LE, SC
1124	Robinson	J	SS, WQ
1125	Robinson	M	SS, WQ
1126	Rochelle	L	LE, SC
1127	Rogers	M	CWA, WQ
1128	Roller-Alling	A	CWA, WQ
1129	Rominger	N	LE, WQ
1130	Roper	R	SS, WQ
1131	Rosati	K	CWA, WQ
1132	Rose	M	LE, WQ
1133	Rose	M	CWA, WQ
1134	Rosen	R	LE, SC
1135	Ross	J	LE, WQ
1136	Ross	S	SS, WQ
1137	Rossen	S	LE, SC
1138	Rouse	K	SS, WQ
1139	Rowe	J	LE, WQ
1140	Rubin	T	LE, SC, WQ, CWA
1141	Rubino	M	SS, WQ
1142	Ruck	L	LE, WQ
1143	Ruck	M	LE, WQ
1144	Rudd	T	LE, WQ
1145	Rummage, Jr.	J	CWA, WQ
1146	Runde	D	LE, WQ
1147	Runyon	A	CWA, WQ
1148	S	N	LE, SC
1149	Sage	R	CWA, WQ
1150	Sahlman	S	CWA, WQ
1151	Sailer	R	CWA, WQ
1152	Salgado	M	SS, WQ
1153	Salgado	L	CWA, WQ
1154	Salvo	A	CWA, WQ
1155	Salwitz	R	CWA, WQ
1156	Sampson	A	SS, WQ
1157	Sanderson	N	CWA, WQ
1158	Sandoval	G	SS, WQ
1159	Sankar	G	LE, SC
1160	Savage	R	LE, SC
1161	Savage	R	LE, SC
1162	Savage	E	CWA, WQ
1163	Savarda	R	LE, WQ
1164	Savino	M	LE, WQ
1165	Schabel	R	LE, SC
1166	Schanbacher	S	LE, SC
1167	Schenkel	S	SS, WQ
1168	Scherl	M	SS, WQ
1169	Schermerhorn	J	SS, WQ
1170	Schmidt	A	LE, WQ
1171	Schmidt	A	CWA, WQ
1172	Schneider	W	SS, WQ
1173	Scholefield	W	SS, WQ
1174	Schreiber	C	LE, WQ
1175	Schreiner	E	LE, WQ
1176	Schrock	M	CWA, WQ
1177	Schwanenflugel	P	CWA, WQ
1178	Schwartz	D	LE, SC
1179	Schweickert	J	LE, SC
1180	Scott	S	LE, SC,
1181	Scott	A	CWA, WQ
1182	Scott	W	SS, WQ
1183	Scott Lane	J	CWA, LE, SC, WQ
1184	Scrufari	A	SS, WQ
1185	Seagal	T	SS, WQ
1186	Sexton	M	SS, WQ
1187	Shaffer	C	LE, SC
1188	Shannon	P	CWA, WQ
1189	Sharfman	W	LE, SC
1190	Sharkshnas	A	LE, SC
1191	Shearer	D	LE, SC
1192	Shell	J	LE, SC
1193	Shelton	D	CWA, WQ
1194	Shepherd	R	LE, WQ
1195	Sher	K	SS, WQ
1196	Shewchuk	C	LE, WQ
1197	Shipman	C	LE, WQ
1198	Shirley	C	CWA, WQ
1199	Shneiderman	D	LE, SC
1200	Shoemaker	C	CWA, WQ
1201	Shoulders	N	SS, WQ
1202	Shouse	D	SC, WQ
1203	Shy	C	LE, WQ
1204	Silver	M	CWA, WQ
1205	Simmons	J	LE, WQ
1206	Simonson	C	CWA, WQ
1207	Simpson	G	LE, WQ
1208	Simpson	E	SS, WQ
1209	Sink	M	CWA, WQ
1210	Sink	K	SS, WQ
1211	Sipes	C	LE, SC
1212	Skelton	M	SS, WQ
1213	Skiba	M	LE, WQ
1214	Skinner	S	LE, WQ
1215	Skodnick	J	SS, WQ
1216	Sloss	B	CWA, WQ
1217	Smallwood	J	CWA, WQ
1218	Smirnov	I	LE, WQ
1219	Smith	G	LE, WQ
1220	Smith	D	LE, WQ
1221	Smith	S	LE, WQ
1222	Smith	B	LE, WQ
1223	Smith	D	LE, SC
1224	Smith	R	LE, SC
1225	Smith	S	LE, SC
1226	Smith	A	LE, SC
1227	Smith	L	CWA, WQ
1228	Smith	A	SS, WQ
1229	Smith	R	SS, WQ
1230	Smith	M	SS, WQ
1231	Smith	A	SS, WQ
1232	Smith	A	SS, WQ
1233	Smith	J	SS, WQ
1234	Smith	D	CWA, WQ
1235	Smith	J	CWA, LE, SC, WQ
1236	Smith	A	WQ
1237	Smith	J	SS, WQ
1238	Smith	J	WQ
1239	Smitley	A	LE, WQ
1240	Smoker	A	LE, WQ
1241	Snider	A	LE, WQ
1242	Snyder	J	LE, SC
1243	Sommer	K	LE, SC
1244	Sonnentag	P	CWA, WQ
1245	Sorensen	R	SS, WQ
1246	Sousa	J	LE, WQ
1247	Southard	G	LE, WQ
1248	Soza	E	LE, WQ
1249	Spaulding	V	CWA, WQ
1250	Speedy	D	CWA, WQ
1251	Spees	L	LE, WQ
1252	Spencer	A	SS, WQ
1253	Spencer	M	SS, WQ
1254	Sperati	J	LE, WQ
1255	Spotz	D	LE, WQ
1256	Spritzbarth	T	SC, WQ
1257	Spruell	M	LE, WQ
1258	Spruill	G	CWA, WQ
1259	Srivastav	R	LE, WQ
1260	Srivastava	S	LE, SC

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Count	Commentor Last Name, Initial		Comment Category (See Appendix B & Note Below)
1261	Stahl	N	LE, WQ
1262	Stahlhut	S	LE, SC
1263	Staley	J	LE, WQ
1264	Stalls	D	LE, WQ
1265	Stanback	F	CWA, WQ
1266	Stanberry	B	CWA, WQ
1267	Starling	R	LE, WQ
1268	Starnes	T	CWA, WQ
1269	Starnes	J	CWA, WQ
1270	Staton	B	CWA, WQ
1271	Steedman	J	LE, SC
1272	Steenwyk	R	CWA, WQ
1273	Steers	S	CWA, WQ
1274	Steil	B	LE, SC
1275	Stemkowski	D	SS, WQ
1276	Stephanie	B	CWA, WQ
1277	Stevens	M	LE, SC
1278	Stevens	W	SS, WQ
1279	Stevens	M	CWA, WQ
1280	Stevenson	T	SS, WQ
1281	Steward	L	LE, SC
1282	Stewart	M	LE, WQ
1283	Stewart	M	CWA, WQ
1284	Stickney	K	LE, SC
1285	Stimson	C	LE, WQ
1286	Stober	P	SS, WQ
1287	Stober	P	CWA, WQ
1288	Stonebraker	A	SS, WQ
1289	Strader	E	CWA, WQ
1290	Stratton	R	LE, WQ
1291	Strauss	D	LE, WQ
1292	Stringer	R	CWA, WQ
1293	Stroupe	F	LE, WQ
1294	Strowd	R	SS, WQ
1295	Sudderth	S	CWA, WQ
1296	Sugg	K	LE, WQ
1297	Sullivan	E	SS, WQ
1298	Svatek	C	SS, WQ
1299	Swafford	K	LE, SC
1300	Swanson	C	WQ
1301	Swenson	K	LE, SC
1302	Swett	R	LE, SC
1303	Swing	C	CWA, WQ
1304	Swofford	C	SS, WQ
1305	Sykes	R	CWA, WQ
1306	Talbert	M	SS, WQ
1307	Tart	H	LE, WQ
1308	Taschuk	M	SS, WQ
1309	Tata	C	LE, SC
1310	Tatum	B	SS, WQ
1311	Tautphaeus	W	LE, SC
1312	Taylor	J	LE, WQ
1313	Taylor	L	LE, WQ
1314	Tedesdco-	T	CWA, WQ
1315	Terrell	D	CWA, WQ
1316	Thacker	C	LE, SC
1317	Thakker	B	LE, SC
1318	Thanasouk	E	LE, SC
1319	Theriault	J	LE, SC
1320	Thomas	F	LE, WQ
1321	Thomas	B	LE, SC
1322	Thompson	L	LE, SC
1323	Thompson	J	CWA, WQ
1324	Thompson	S	CWA, WQ
1325	Thompson	V	SS, WQ
1326	Thorn	W	LE, SC
1327	Tice	J	LE, SC
1328	Tilley	S	LE, SC
1329	Tisdale	A	LE, SC
1330	Tokarczyk	J	SS, WQ
1331	Tolbert	B	LE, WQ
1332	Tompkins	S	CWA, WQ
1333	Torres	T	LE, SC
1334	Trautmann	C	LE, WQ
1335	Traywick	M	LE, SC
1336	Treadway	L	LE, SC
1337	Trefz	T	LE, SC
1338	Tripp	W	LE, WQ
1339	Trossen	W	LE, WQ
1340	Trout	C	LE, WQ
1341	Tubileja	P	SS, WQ
1342	Turco	M	SS, WQ
1343	Turner	D	SS, WQ
1344	Turner	J	SS, WQ
1345	Tuttle	M	LE, SC
1346	Tuttle	J	SS, WQ
1347	Tyndall	L	CWA, WQ
1348	Tyson	S	LE, SC
1349	Tyson	S	SS, WQ
1350	Ulirsch	P	SS, WQ
1351	Unruh	J	LE, WQ
1352	Valestin	P	LE, SC
1353	Van Devender	A	CWA, WQ
1354	Van Eyk	K	SS, WQ
1355	Vandergoot	B	CWA, WQ
1356	Varner	M	LE, WQ
1357	Varner-Munt	S	LE, WQ
1358	Varner-	D	LE, WQ
1359	Venier	W	CWA, WQ
1360	Ventre	J	LE, WQ
1361	Verhelle	R	LE, SC
1362	Vescio	P	LE, SC
1363	Vetter	A	LE, WQ
1364	Vilas	C	CWA, WQ
1365	Villafranca	W	LE, WL, WQ
1366	Vlasits	G	LE, WQ
1367	Voelker	L	LE, SC
1368	Voelker	R	SS, WQ
1369	Volker	E	SS, WQ
1370	Vollum	M	SS, WQ
1371	Votyakov	P	LE, SC
1372	Vue	M	LE, WQ
1373	Wagner	R	LE, WQ
1374	Wait	K	CWA, WQ
1375	Waldrop	T	LE, WQ
1376	Walker	C	LE, WQ
1377	Walker	C	SS, WQ
1378	Walker	L	SS, WQ
1379	Wally	D	LE, SC
1380	Walters	R	LE, SC
1381	Walton	J	LE
1382	Waltz	M	LE, SC
1383	Ward	W	LE, WQ
1384	Ward	S	CWA, WQ
1385	Warot	D	LE, WQ
1386	Warren	K	CWA, WQ
1387	Warwick	E	LE, SC
1388	Watkins	J	LE, WQ
1389	Watson	C	LE, SC
1390	Watson	M	CWA, WQ
1391	Watts	K	LE, SC
1392	Weatherman	L	SC, WQ
1393	Weaver	A	LE, WQ
1394	Webb	J	SS, WQ
1395	Wechter	M	LE, WQ
1396	Weigner	J	LE, SC
1397	Weil	S	CWA, WQ
1398	Weisberg	L	LE, WQ
1399	Weisser	M	LE, WQ
1400	Welborn	A	LE, SC
1401	Weldon	W	SS, WQ
1402	Welgos	S	SS, WQ
1403	Wells	D	LE, WQ
1404	Wells	L	LE, SC
1405	Wells	M	SS, WQ
1406	Wells	L	CWA, WQ
1407	Wenda	S	WQ
1408	Wenda	R	WQ
1409	Werner	F	SS, WQ
1410	West	R	CWA, WQ
1411	West	S	LE, SC
1412	Westbrook	B	SS, WQ
1413	Wester	M	SS, WQ
1414	Wheeler	J	CWA, WQ
1415	Wheelock	J	LE, SC
1416	Whitman	J	LE, WQ
1417	Whitman	C	LE, WQ
1418	Whitney	J	LE, WQ
1419	Whitson	Z	LE, WQ
1420	Wiemer	J	SS, WQ
1421	Wieting	A	SS, WQ
1422	Wilcox	P	LE, WQ
1423	Wildman	B	LE, WQ
1424	Wilkes	A	LE, WQ
1425	Wilkins	B	SS, WQ
1426	Willhoit	L	LE, WQ
1427	Williams	M	LE, WQ
1428	Williams	P	SS, WQ
1429	Williams	S	CWA, WQ
1430	Williams	J	SS, WQ
1431	Williams	E	SS, WQ
1432	Williams	F	CWA, WQ
1433	Williams	D	CWA, WQ
1434	Wilson	T	WL, WQ
1435	Wilson	W	LE, WQ
1436	Wilson	J	SS, WQ
1437	Wilson	E	SS, WQ
1438	Wilson	F	SS, WQ
1439	Wilson	K	SS, WQ
1440	Wilson	D	SS, WQ
1441	Wilson	T	CWA, WQ
1442	Winchell	K	CWA, WQ
1443	Winchester	M	LE, WQ
1444	Winfree	J	LE, WQ
1445	Wingeier	D	LE, WQ
1446	Winn	P	SS, WQ
1447	Winn	E	CWA, WQ
1448	Winne	P	LE, WQ
1449	Winstead	T	LE, WQ
1450	Winter	W	LE, WQ
1451	Winter	K	LE, SC
1452	Winterberger	C	CWA, WQ
1453	Witter	B	CWA, WQ
1454	Witty	H	LE, WQ
1455	Wolf	J	LE, WQ
1456	Wolfe	G	LE, WQ
1457	Womble	A	LE, SS
1458	Womble	J	LE, SC
1459	Wood	K	LE, WQ
1460	Wood	S	LE, SC
1461	Wood	J	LE, SC
1462	Wood	J	SS, WQ
1463	Wood	L	CWA, WQ
1464	Wood	T	SS, WQ
1465	Woodall	I	LE, WQ
1466	Woods	P	SS, WQ
1467	Worth	J	CWA, WQ
1468	Wright	M	LE, WQ
1469	Wright	K	LE, WQ
1470	Wright	R	LE, SC

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1471	Wright	P	LE, SC
1472	Wussow	N	LE, WQ
1473	Wynn	P	LE, WQ
1474	Yarborough	T	SS, WQ
1475	Yarosis	N	CWA, WQ
1476	Yates	C	SS, WQ
1477	Yavelow	L	CWA, WQ
1478	Yewcic	S	CWA, WQ
1479	Yokote	P	LE, WQ
1480	Young	R	LE, SC
1481	Young	S	LE, SC
1482	Young	C	SS, WQ
1483	Young	D	CWA, WQ
1484	Younts	C	SS, WQ
1485	Zalesak	M	CWA, WQ
1486	Zeko	S	LE, SC
1487	Zellman	S	LE, SC
1488	Zimmer	S	CWA, WQ
1489	Zimmerman	D	CWA, WQ
1490	Zimmerman	T	SS, WQ
1491	Zinich	J	LE, WQ
1492	Zizzo	J	LE, WQ

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