

Buckeye Lake Fisheries Management Plan Before, During, and After Dam Repair July 1, 2015

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The Ohio Department of Natural Resources has decided that the water level in Buckeye Lake must remain at winter pool (888.75 ft. above sea level, three feet below summer pool), until the 177-year old dam can be repaired. Repair of the 4.1 mile dam will require several years due to the extensive planning, preparation, and construction required. Therefore, the Division of Wildlife believes that it is necessary to implement a three-phase plan for the management of the Buckeye Lake fishery that includes: 1) the transition to low-water conditions; 2) a period of maintenance through the initial return to full pool; and 3) a restoration period following the return to full pool.

Reduction in surface area, volume, and shoreline of Buckeye Lake may have a significant effect on the fish populations because the low-water period is anticipated to remain approximately 5 years. At full pool, the watershed is more than 26 times larger than the surface area of the lake and water residence is approximately 69 days, meaning that the reservoir volume fully exchanges more than five times during a typical year. Under reduced pool conditions the water residence time will decrease. The surface area is now reduced from 2,873 acres to 2,363 acres, with only 900 acres that are 3 feet or deeper, thus the volume of water is reduced from 14,641 acre-feet to 6,462 acre-feet and the shoreline is reduced from 50.39 miles to 36.25 miles. Buckeye Lake is also extremely nutrient rich as a result of watershed conditions and sediments that have accumulated during almost two centuries of impoundment.

A special consideration for fisheries management during the reduced pool period is that Buckeye Lake may be prone to periodic fish kills resulting from the reduced volume, substantial nutrient load, and high densities of fish. Small fish kills annually occur in Buckeye Lake, particularly during periods when water released to outflows (e.g., spillways) is reduced for water management purposes, often during spring. Small fish kills are also common during the summer when the canals stagnate and lack sufficient oxygen. Buckeye Lake has also experienced large fish kills in the past due to periods of hot, windless, summer weather that create brief periods of severe oxygen depletion throughout the reservoir. The last major fish kill resulting from this situation was more than 20 years ago. Algal blooms that are historically a part of the lake have received greater attention during the last several years and may further compound issues related to fish kills and management of the fishery.

The goal of the *Buckeye Lake Fisheries Management Plan* is to maintain sport fishing opportunities that minimize the risk of fish kills during the low-water period and restore full sport fishery capacity within three years of the lake returning to full pool.

Transition to Low-Water Conditions

The first year of low-water conditions will be one of transition for the fish population and anglers. Fish will face reduced habitats and challenging environmental conditions and anglers will encounter issues with access. Seven objectives are established in this first year to facilitate a transition to a period of reduced fish abundance and changes in the lake.

Objective 1.1: Update the Buckeye Lake fishing map to reflect the low-water conditions and make it available to anglers in hard copy and on the internet by June 1, 2015.

The Buckeye Lake map will be updated with new depth and shoreline information to help anglers with access and fishing opportunities. A hard copy of the map will be available through the Division of Wildlife and an electronic copy will be available on the Division of Wildlife website.

Objective 1.2: Reduce the abundance of sport fishes through reductions in fish stocking.

Buckeye Lake is well known as an exceptional reservoir for saugeye and hybrid striped bass fishing. However, given the reduced water level and associated habitat, the usual stocking practices would likely crowd fish and promote fish kills. Therefore, saugeye will be stocked at one-third the normal rate and the stocking of hybrid striped bass will be discontinued until the lake is returned to full pool and standard dam operations.

Objective 1.3: Allow natural growth of shoreline vegetation to provide future fish habitat.

Shoreline areas of Buckeye Lake that are now exposed due to the lower water levels will provide opportunities for rooted vegetation to grow if left to natural processes. This growth will provide the immediate benefits of nutrient uptake from the soil and in the future create cover for fish such as largemouth bass, crappie, and bluegill once the reservoir is returned to full pool. It is expected to promote successful spawning and survival of fish and expedite restoration of fish abundances that will produce quality fishing.

Objective 1.4: Monitor largemouth bass, crappie, and saugeye through standardized sampling approaches.

Routine surveys of fish populations are conducted each year at Buckeye Lake and other reservoirs throughout the state using the standard operating procedure referred to as the Inland Management System. These standardized surveys will continue at Buckeye Lake to monitor largemouth bass, crappie, and saugeye populations. Results can be compared to previous surveys at Buckeye Lake and other reservoirs throughout the state to better understand conditions in the reservoir.

Objective 1.5: Evaluate the need for changes in harvest regulations for largemouth bass, crappie, and saugeye that would further reduce fish abundance.

Following the first year of low-water conditions, biologists will evaluate whether there is a need for further reducing the numbers of fish in Buckeye Lake by removing existing harvest regulations for black bass (12-inch length limit, 5 fish daily limit), crappie (9-inch length limit, 30 fish daily limit), and saugeye (15-inch length limit, 6 fish daily limit). If a reduction is considered necessary, regulations would be proposed the following year and implemented beginning March 2017.

Objective 1.6: Routinely communicate with the Ohio Environmental Protection Agency regarding water quality conditions monitored through the Buckeye Lake Nutrient Reduction Study.

The Ohio Environmental Protection Agency (OEPA) initiated a study of Buckeye Lake water quality in 2015 to closely monitor conditions of the reservoir during the low-water period. This study will provide extensive monitoring of nutrients, temperature, and oxygen levels and this information will provide insights regarding the potential for algal blooms. The Division of Wildlife will routinely communicate with OEPA to track potential conditions that may promote fish kills. Results from this study may inform decisions regarding management of sportfish abundances in the reservoir.

Objective 1.7: Investigate and respond to major fish kills should they occur and adjust standard operating procedures for responses, if necessary, to improve future responses.

Minor fish kills at Buckeye Lake caused by routine reservoir conditions, such as maintenance of water levels, are anticipated in areas where fish may be stranded, in spillways, or canals and do not require a response. However, should a major fish kills occur, the Division of Wildlife will respond and investigate these kills per a standard operating procedure (SOP) provided in the appendix. Adjustments in the SOP will be anticipated based on experiences from its use, if necessary.

Maintenance: 2016 Through Initial Return to Full Pool

The period following the initial year of low-water conditions will be one of adaptive management based on conditions experienced each year. Determinations must be made to continue stocking saugeye at a reduced rate, or further reduce stocking, and to initiate the process for removal of harvest restrictions for black bass, crappie, and saugeye, if necessary. Monitoring of populations will continue and the Division of Wildlife will remain alert to the potential for major fish kills. Six objectives that are similar to those from the transition period are established for this longer period.

Objective 2.1: Annually evaluate the need to further reduce or temporarily discontinue stocking saugeye.

Based on the survival of saugeye stocked during the previous year and success of adult fishes through the summer period, an annual review must be made to determine whether to continue stocking saugeye at a reduced rate, further reduce the stocking rate, or discontinue stocking until the reservoir is returned to full pool.

Objective 2.2: Monitor largemouth bass, crappie, and saugeye through standardized sampling approaches.

Monitoring of black bass, crappie, and saugeye will continue through the routine schedule implemented for reservoirs. Supplemental sampling will be conducted if necessary based on these results.

Objective 2.3: Allow natural growth of shoreline vegetation to provide future fish habitat.

We will continue to promote vegetation growth through natural processes for immediate and future benefits. Areas should be left undisturbed to the greatest extent possible.

Objective 2.4: If determined necessary during 2015, initiate the process to adjust harvest regulations for largemouth bass, crappie, and saugeye to reduce fish abundance as soon as possible.

Based on the survival of all sportfishes, stocked and naturally reproducing, a determination will have been made late in 2015 to consider adjustments in sportfish harvest regulations. If necessary, the formal process to adjust regulations will begin in 2016 with proposals that, if approved and acceptable to the public, would be implemented March 1, 2017. This process could be expedited if necessary.

Objective 2.5: Routinely communicate with the Ohio Environmental Protection Agency regarding water quality conditions routinely monitored through the Buckeye Lake Nutrient Reduction Study.

The Division of Wildlife will continue routine communications with OEPA regarding routine water quality data collections from the nutrient reduction study and consider findings in decisions regarding the management of sportfish abundance.

Objective 2.6: Investigate and respond to major fish kills should they occur.

Similar to 2015, the Division of Wildlife will respond to and investigate major fish kills per a standard operating procedure provided in the appendix.

Restoration: Return to Standard Dam Operating Conditions

The three years following the return of Buckeye Lake to full pool will be a period of fishery restoration and increased activity by the Division of Wildlife. This will also be a period of adjustment for fish populations and anglers. The reservoir may experience a “new reservoir” effect associated with fish that naturally reproduce, whereby their reproductive success is very high due to expanded habitats and cover for spawning and improved survival of young fishes. In addition, stocking of saugeye and hybrid striped bass will resume at regular levels and regulations will be revisited if adjusted in prior years to reduce fish abundance. Routine fish survey work will be implemented on an annual basis during these years and a creel (angler) survey will be conducted in the fourth year to evaluate progress.

Objective 3.1: Update the Buckeye Lake fishing map to reflect the new full-pool conditions and make it available to anglers in hard copy and on the internet within one year of the return to full pool.

The Buckeye Lake map will be updated with new depth and shoreline information following repair of the dam and the return to full pool. New bathymetry data must be collected because the shape of the lake and some depth characteristics are anticipated to change. A hard copy of the map will be available through the Division of Wildlife and an electronic copy will be available on the Division of Wildlife website.

Objective 3.2: Resume stocking saugeye and hybrid striped bass.

Saugeye stocking will resume at either 100 fingerlings per acre or 1,000 fry per acre based on the new reservoir surface area. Likewise, hybrid striped bass stocking will be resumed at 275 fry per acre.

Objective 3.3: Monitor largemouth bass, crappie, saugeye, hybrid striped bass, and water quality through standardized sampling approaches.

Routine surveys of major sportfish populations through the Inland Management System will be conducted for three consecutive years to evaluate restoration of fish populations. In addition, routine water quality sampling will resume assuming that the OEPA study has been completed.

Objective 3.4: Evaluate the status of harvest regulations for largemouth bass, crappie, saugeye, and hybrid striped bass and implement changes if necessary.

Adjustments in harvest regulations may be necessary for major sport fishes. If changes were made during the previous years, they could be reconsidered at this time in an effort to help protect fish populations from harvest through the restoration period to rebuild fish abundances.

Objective 3.5: Evaluate angler success through a standardized creel (angler) survey in the fourth year following the return to full pool.

An angler survey will be conducted during the fourth year following a return to full pool to assess stocking, regulations, and restoration of sportfish populations based on measurements of angler effort, catch, harvest, and opinions of the fishery.

Appendix: Buckeye Lake Fish Kill Response Procedures

The potential for fish kills at Buckeye Lake may be greater during the next several years due to the need to maintain water levels at winter pool until the dam can be repaired. An overview of the procedure to respond to fish kills is provided in a flow chart (attached) and details are provided below.

Response Procedure Flow (also see accompanying flow chart):

1. Reports of a fish kill of any sizes should be initially directed to the staff at Buckeye Lake State Park (BLSP) given their proximity to the reservoir and level of daily activity there. GO TO STEP 2 (below).
2. BLSP will respond immediately to reports of a fish kill to determine the validity of the report and the appropriate action. One of two responses is anticipated:
 - a. Verification (NO): responding staff will file a report indicating the date and time of the report, the specific location within or near the reservoir, the source of the report, who responded, what was found, and what actions were taken. Form 1.1 is provided for this report. STOP.
 - b. Verification (Yes):
 - If > 1,000 fish are found dead, BLSP will contact the ODNR Communications Center to report a “non-critical incident” (potential pollution incident). GO TO STEP 3.
 - If <1,000 fish are found dead, two actions will be taken by BLSP:
 - 1) deploy State Parks (SP) staff to pick up fish if they determine numbers warrant this response;
 - 2) file a report detailing the same specifics as above which also includes a rough estimate of the numbers of fish picked up and the approximate species composition (e.g., 90% gizzard shad, 5% common carp, 2% catfish, 1% bluegill, 1% crappie, 1% black bass). Form 1.1 is provided for this report. STOP.
3. ODNR Communications Center immediately contacts Division of Wildlife Law Enforcement staff in District 1 (Columbus), beginning with officers in Licking or Fairfield Counties. GO TO STEP 4.
4. District 1 Law Enforcement staff invokes Policy 24 and Procedure 26 to determine whether the reported fish kill is the result of a pollution incident and would result in a pollution case for further investigation. One of two situations would be identified:
 - a. Pollution Case (YES): If the incident is suspected to be a pollution case, two actions are taken:
 - 1) Contact District Manager Korey Brown (District 1) and Rich Carter (Fish Management). If neither Korey or Rich are available, the next point of contact is Scott Hale (Fish Management) followed by Marty Lundquist (Fish Management). Carter or the next person in the chain of command will contact Susie Vance (I&E) and initiate immediate deployment of fish management staff from District 1, with Marty Lundquist leading this response to assist Law Enforcement with the investigation and assist in picking up fish.

- 2) Complete the investigation, via Policy 24, Procedure 26, and a modified Procedure 87. GO TO STEP 5.
 - b. Pollution Case (NO): Contact District Manager Korey Brown (District 1) and Rich Carter (Fish Management). If neither Korey or Rich are available, the next point of contact is Scott Hale (Fish Management) followed by Marty Lundquist (Fish Management). Carter or the next person in the chain of command will contact Susie Vance (I&E) and initiate immediate deployment of fish management staff from District 1, with Marty Lundquist leading this response by determining the extent of the fish kill and recommending the next level of response. GO TO STEP 5.
5. The estimated number of dead fish, or anticipated numbers of dead fish based on the initial response from District 1 Fish Management staff, will result in a determination of the extent of crew deployment necessary to pick up dead fish and further assess the situation. **It is imperative that District 1 staff or backup staff (Inland Fisheries Research Unit, Hebron State Fish Hatchery, District 4 Fish Management) respond immediately for assessment and to initiate fish pickup if the kill appears to be more than a minor kill in the lake or a larger kill that is limited to outflow areas (spillways, canal, or adjacent creeks). Length of day for all responses should depend upon the circumstances of a kill, but will not exceed 8:00 PM.**
- a. **Level 1 Response:** Estimated <10,000 dead fish results in a response of one boat crew from District 1 that will conduct a 1-day pickup of fish, followed by an additional return to the site the next day to verify that the kill has ended, and documentation of the results using Form 1.1. Staff from the Inland Fisheries Research Unit will provide additional support if needed. STOP.
 - b. **Level 2 Response:** Estimated 10,000-500,000 dead fish results in a response of two boat crews, one from District one and the other from the nearby Inland Fisheries Research Unit, a 1-day pickup of fish, and a disposal crew from the Hebron State Fish Hatchery, followed by an additional return to the site the next day to verify that the kill has ended, and documentation of the results using Form 1.1. Staff from Fish Management staff from District 4 (Athens) will provide additional support if needed. STOP.
 - c. **Level 3 Response:** Estimated >500,000 dead fish results in a response of three boat crews, two from District one and one from the nearby Inland Fisheries Research Unit, a 2-day pickup of fish, and a disposal crew from the Hebron State Fish Hatchery, followed by an additional return to the site the next day to verify that the kill has ended, and documentation of the results using Form 1.1. Staff from Fish Management staff from District 4 (Athens) will provide additional support if needed. STOP.

On-Site Procedures for Level 1, 2, and 3 Responses

- 1) The initial staff response should be from Fish Management staff from District 1, or their backups (Inland Fisheries Research Unit, Hebron State Fish Hatchery, or Fish Management staff from District 4), to determine the necessary level of response. The assessment should include:
 - a. Estimate of the kill size and species composition
 - i. Drive the lake and estimate the percentage of the lake that has experienced a kill by recording GPS readings of the kill perimeter.
 - ii. Drive 3 transects and collect and count fish by species to provide a rough estimate of the percent of each killed and note the general size of fish (adults, young, or both).

- iii. Estimate the number of dead fish in 3 locations by counting the dead fish in an area that is roughly 30 feet by 30 feet and multiplying the average of the three counts by 48.4 to obtain an estimate of the numbers of dead fish per acre within the kill area.
 - iv. Measure temperature and oxygen at several locations within and outside of the kill area.
- 2) Following the assessment, collect dead fishes via boats from the areas of their greatest concentration, load them in boats into trash cans, and return to the boat ramp when trash cans are full. DO NOT collect fishes by walking shorelines as this may be very hazardous during most portions of the year. The bottom sediments of the lake are unstable in most areas and safe shoreline access will likely be very limited.
 - a. Fish disposal
 - i. Small numbers of fish can be taken out in boats and trash cans and disposed of in the switchgrass area or prepared pits at the Hebron State Fish Hatchery.
 - ii. Larger numbers of fish (Level 2 and Level 3 responses) will require a pickup truck or dump truck from the Hebron State Fish Hatchery to transport fish to the hatchery for disposal. Sufficient numbers of trash cans should be available to exchange with the disposal crew.
 - 3) Continue fish collection according to the level of response required.
 - 4) Monitor reservoir conditions after the last day of picking up dead fish.

Crew Size and Equipment

- Each boat crew should consist of one driver and two fish dippers in uniforms
- Each disposal crew should consist of two individuals in uniforms
- Boats, trailers, and trucks from fish units
- Camera
- GPS unit
- Boats should be equipped with a minimum of four trash cans, three dip nets, and standard safety equipment
- YSI temperature and oxygen meter
- Rubber or latex gloves
- Trash bags
- Measuring board
- Lake maps.
- Clipboard and data sheets
- Cooler
- Form 1.1

Access

Boat access for launching is limited to the North Shore ramp effective 5/6/2015. Boats should proceed with caution in all areas. Boat crews must accept that some stranded or dead fish cannot be picked up due to limited boat access. Crews working the main lake are NOT to wade any shoreline areas to pick up fish due to the hazards presented by the depth of soft bottom sediments. Staff safety is the first priority in any effort to pick up dead fish.

Summary Points Regarding Fish Kills in Inland Lakes and Reservoirs

Prepared by Scott Hale (scott.hale@dnr.state.oh.us)

Small numbers of dead or stressed fish are not uncommon in Ohio lakes and reservoirs, particularly during the periods immediately after ice-out, during late April through mid-June, and during prolonged periods of hot summer weather.

Minor fish kills rarely have a significant impact on fish populations or fishing in lakes and reservoirs.

Observations of small numbers of dead fishes (less than 1,000) rarely represent significant fish kills that require investigation unless the cause is suspected to be pollution.

Fish kills unrelated to pollution often result from:

- post-winter thermal stress, observed immediately after ice-out following severe winters;
- post spawning vulnerability, typically during late-April through mid-June, promoted by spawning stress and exposure to viruses and other pathogens activated by warming water temperatures;
- low dissolved oxygen conditions due to hot summer weather patterns, particularly in backwaters such as canals, small embayments, or other shallow, wind-protected areas;
- poor quality water discharged from dams designed to release water from the bottom of a reservoir that periodically create brief, but lethal conditions for fish in tailwaters;
- fish stranded during routine dam operations such as reservoir water level management or maintenance that reduces or eliminates flow to emergency spillways or tailwaters.

Gizzard shad are the fish most commonly observed in lake and reservoir fish kills because they are nearly always the most abundant species in these waters. They are extremely sensitive to changes in water temperature, oxygen levels, and pathogens. They are not sportfish that anglers catch; rather, they are “food fish” for sportfish and very prolific spawners that rebound quickly from fish kills.

Concerned citizens should not attempt to rescue stressed or dead fish. Handling stressed fish significantly reduces their chance of survival and attempts to capture these fish may present a safety hazard to those attempting to do so.

The ODNR Division of Wildlife will not collect stressed fish in an attempt to relocate them to other waters or a fish hatchery because doing so could transfer diseases or parasites. This is why it is illegal for anglers to move fish from one public water body to another.

The ODNR Division of Wildlife will investigate all significant fish kills where pollution is suspected. Concerned citizens that see large numbers of dead fish should report them to 1-800-WILDLIFE.

The ODNR Division of Wildlife does not routinely patrol waters to pick up small numbers of dead fish. This is not feasible given responsibilities for 2.3 million acres of Lake Erie, 451 miles of Ohio River shoreline, 60,000 miles of rivers and streams, and more than 180 inland lakes and reservoirs.

In the event of major fish kills, most fish populations in lakes and reservoirs rebound within a year or two given the proper environmental conditions and habitat.

Form 1.1: Fish Kill Reporting (Current July 1, 2015)

General Information:

Date: _____ **Time:** _____

Location: _____

Source of Report: _____ **Phone (h):** _____
Name: _____ **Phone (c):** _____
 _____ **e-mail:** _____

Responder: _____ **Agency:** _____

Report Prepared By: _____ **Verified:** Yes / No

Conditions Observed:

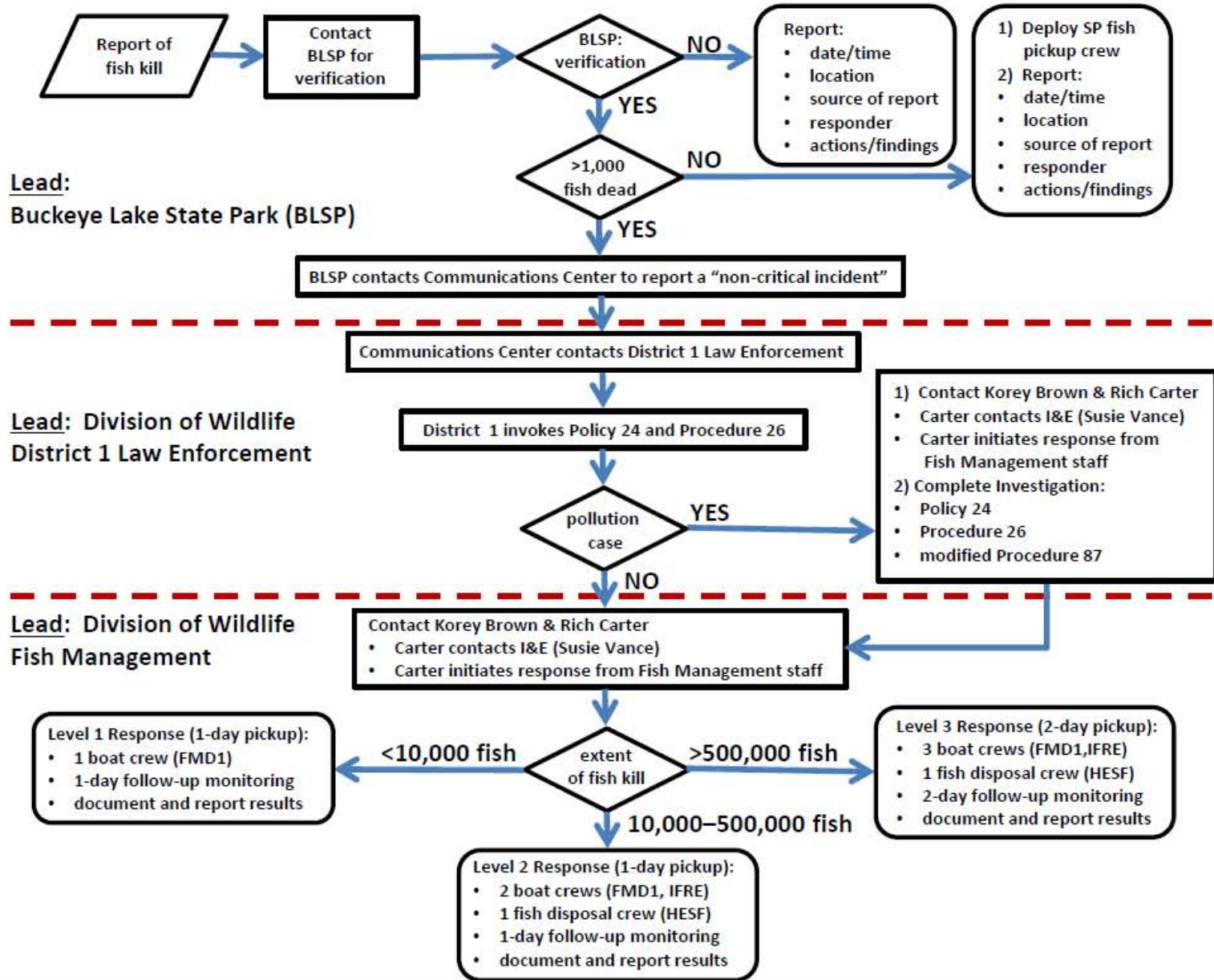
Actions/Response:

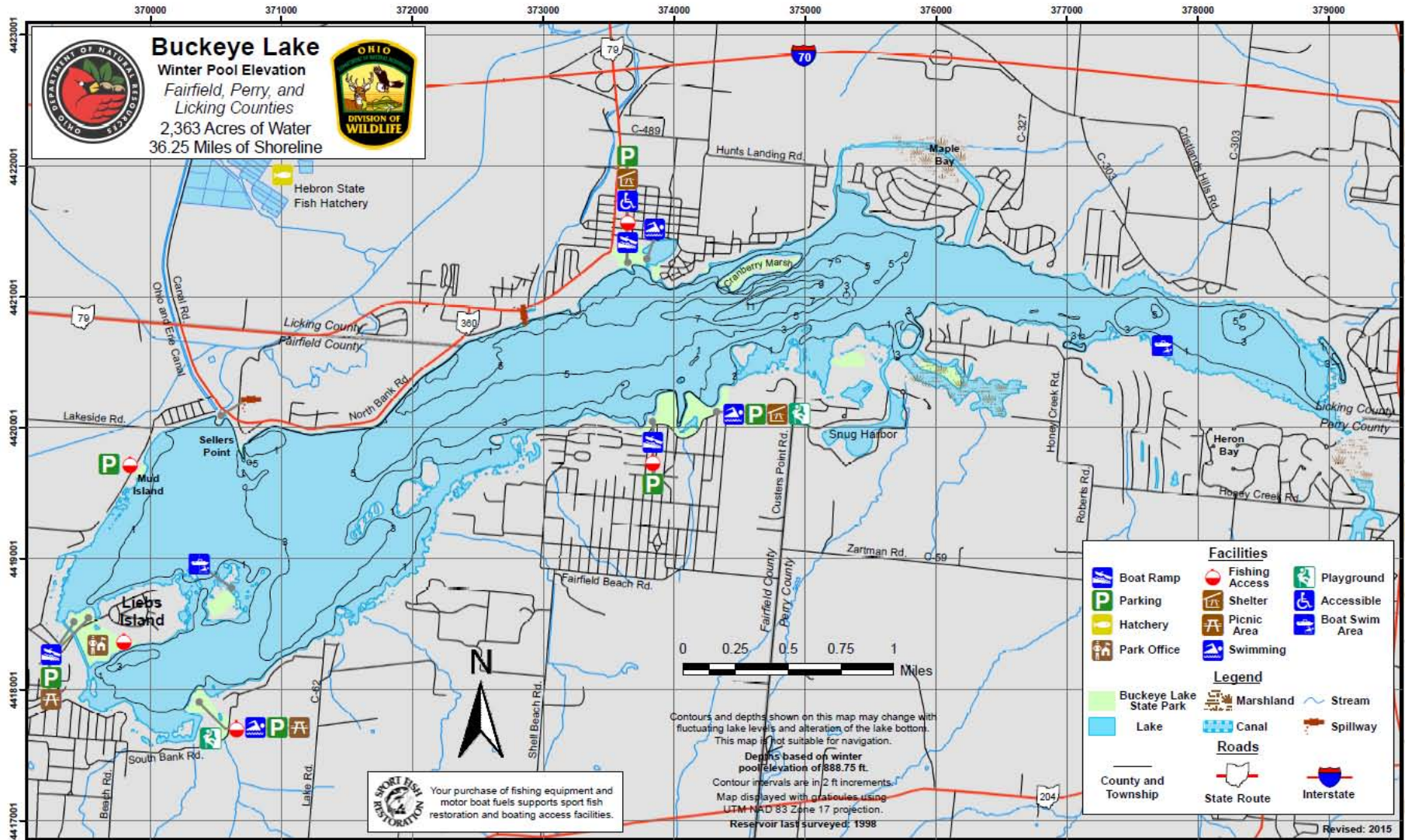
Comments:

Estimate of Dead Fishes:

Species	Number	% of Total		Species (Other)	Number	% of Total
Gizzard Shad						
Common Carp						
Bluegill/Sunfish						
Crappie						
Largemouth Bass						
Saugeye						
Hybrid Striped Bass						
Channel Catfish						
Flathead Catfish						
Bullheads						

Buckeye Lake Fish Kill Response Procedure





Buckeye Lake Fishing Map - Winter Pool

Map of Buckeye Lake at the reduced (winter) pool level of 888.75 feet elevation.