Updated January 3, 2023

Division Position Paper

Management of Hydrilla in Texas Reservoirs

Inland Fisheries Division
Texas Parks and Wildlife Department

Background: The Land and Water Resources Conservation and Recreation Plan (Land & Water Plan) outlines goals, objectives, strategies and science-based actions to be undertaken by the Texas Parks and Wildlife Department (TPWD) in fulfilling its mission. A primary goal is to practice, encourage and enable science-based stewardship of natural and cultural resources, ensuring that TPWD maintains the highest level of scientific validity and credibility. In support of this goal, the Land & Water Plan identifies the need to develop position papers explaining the basis for the agency's positions and perspectives.

Purpose: This document outlines the official position of the Inland Fisheries Division of TPWD on the issue of hydrilla (*Hydrilla verticillata*) management in Texas reservoirs. This paper is intended to achieve clear and consistent messaging and a unified perspective as Inland Fisheries Division staff communicate with stakeholders, media, and the public on this issue.

Primary Points of Contact on Hydrilla Management:

- District Fisheries Biologists – survey, monitor, make recommendations and implement hydrilla management.
- Regional Directors – provide guidance, oversight, and continuity in the management of hydrilla
- Team Leader for Aquatic Habitat Enhancement – guides, recommends and implements herbicide and other treatments of aquatic vegetation
- Senior Scientist for Aquatic Invasive Species – guides and implements management, research, policy, and regulation of aquatic invasive species
- Regulations and Policy Coordinator – guides and oversees regulation and policy development and implementation
- Web Administrator – responds to requests for information and questions
- TPWD Media Office Information Specialist – guides, oversees, and implements media relations for Inland Fisheries

NOTE: Media inquiries and responses provided by Inland Fisheries Division staff on the topic of hydrilla management should be coordinated with the TPWD Media Office.

Reference Materials:

- State Aquatic Vegetation Plan
- Inland Fisheries Aquatic Habitat Survey Procedures
- Invasive, Prohibited, and Exotic Aquatic Plants
- Management of Hydrilla in Texas Reservoirs

Inland Fisheries Division Position Statement on the Management of Hydrilla in Texas Reservoirs:
It is the position of the Inland Fisheries Division that native aquatic plant communities serve ecological functions that support diverse aquatic communities and sustain recreationally and economically important fisheries in Texas reservoirs. The Inland Fisheries Division considers hydrilla to be an invasive, non-native aquatic plant that can, at high densities, adversely impact native plant abundance, sport fish

growth, recreational use, flood control, and dissolved oxygen. Once established, hydrilla has proven difficult to eradicate with current technology and is expensive to manage. Therefore, TPWD prohibits the deliberate introduction of hydrilla into Texas reservoirs. The Inland Fisheries Division prefers to manage for native aquatic plants but recognizes that in reservoirs where native submersed aquatic plants are absent or limited, hydrilla at low to moderate densities can be beneficial to some fish populations.

The Inland Fisheries Division will assess occurrence of hydrilla in Texas reservoirs on a case-by-case basis (i.e., waterbody by waterbody and temporally) to determine the level of management needed. In waterbodies where hydrilla is well-established, it will be managed at levels commensurate with the primary uses and functions of the reservoir, riverine ecosystems, and fisheries management and conservation goals. The Inland Fisheries Division, in cooperation with resource management partners and local stakeholders, will assess and recommend the level of hydrilla management on each public waterbody with consideration of factors such as water access, recreational use, fisheries values, maintenance of public water infrastructure (e.g., water conveyance, municipal water supply), and available treatment capacity. Other factors such as available control methods (e.g., mechanical, chemical, biological), current waterbody condition, and activities occurring within the watershed will also influence the scope and timing of hydrilla management.

Key Messages and Talking Points on Hydrilla Management: Inland Fisheries Division staff are encouraged to utilize the following messages and talking points as communications occur with stakeholders, media, and the public on this issue:

- In reservoirs, hydrilla at low to moderate densities can provide beneficial habitat to some fish species (e.g., Largemouth Bass, sunfishes). Problems associated with hydrilla are typically limited to access issues along reservoir shorelines.
- Hydrilla is listed as a prohibited exotic species, so its deliberate introduction to any waterbody in the state is unlawful.
- When hydrilla is present in a reservoir or river system, the Inland Fisheries Division performs aquatic vegetation surveys to assess and monitor coverage.
- Issues with hydrilla in Texas reservoirs frequently resolve themselves over time with no treatment because of environmental conditions not conducive to aquatic plant growth, such as floods, droughts, water level fluctuations, cold winter water temperatures, or extended periods of high turbidity.
- The reservoir controlling authority is ultimately responsible for making the final decision on whether treatment of hydrilla will occur, but the Inland Fisheries Division provides management recommendations and reviews treatment proposals to ensure consideration of fisheries management goals.
- The Inland Fisheries Division may cover costs associated with maintaining public access areas inhibited by excessive vegetation (e.g., boat launches, boating lanes, fishing piers, swim beaches). Costs for larger-scale treatments, when not necessary to achieve fisheries management goals, are performed in cooperation with the controlling authority and stakeholders.

Inland Fisheries Division Perspective on Hydrilla Management:

- The Inland Fisheries Division recognizes the positive impact hydrilla can have on Largemouth Bass populations, angling opportunities, and related local economic benefits as reservoirs age.

- The Inland Fisheries Division recognizes hydrilla can become invasive and negatively impact access to the water, recreational boating (i.e., impeding navigation), and operations by controlling authorities.
- The Inland Fisheries Division conducts routine monitoring of waterbodies where hydrilla is present to evaluate coverage, inform management recommendations, and communicate with stakeholders.
- In determining the potential need for large-scale treatment of hydrilla, a variety of factors are considered, including distribution of hydrilla, primary reservoir uses, observed and potential impacts, the reservoir's physical and biological attributes (e.g., submerged contour, hydrology, and nutrient loading), adjacent aquatic ecosystems, conservation objectives, and stakeholder interests.
- Each reservoir presents a unique set of circumstances in terms of the potential hydrilla treatment strategies. Management recommendations may range from routine monitoring, to targeted treatments, to large-scale integrated pest management.
- The reservoir controlling authority is ultimately responsible for making the final decision on whether any treatment of hydrilla will occur and the specific treatment methods to be used. The Inland Fisheries Division will coordinate closely with the controlling authority and stakeholders to make recommendations, provide data, and review all treatment proposals to ensure consistency with the State Aquatic Vegetation Plan. The Inland Fisheries Division may deny or require modifications to treatment proposals expected to negatively impact fisheries or aquatic habitats.
- When total vegetation coverage is less than 40% of reservoir surface area, the Inland Fisheries Division will typically recommend conducting hydrilla treatments in areas where public access is impeded (e.g., boat ramps, fishing piers, swimming areas, shorelines of campsites, boat lanes).
- In general, when total vegetation coverage exceeds 40% of reservoir surface area, the Inland Fisheries Division will partner with controlling authorities and stakeholders to develop and implement an integrated pest management strategy.
- Any treatment plan will consider potential effects on the fishery with the goal of maintaining sufficient aquatic vegetation coverage (typically 10-40% of reservoir surface area; includes all aquatic plants) to sustain the fishery for sunfishes (*Lepomis* spp.) and Largemouth Bass (*Micropterus salmoides*), while also considering impacts to other stakeholders and reservoir use.

Background Information:

Submerged aquatic vegetation arguably provides cover of greatest value to freshwater fisheries in Texas reservoirs and contributes to fueling the aquatic food web. Physical characteristics (interstitial spaces in the vegetation) provide high-quality habitat. Sunfishes (*Lepomis* spp.) and Largemouth Bass (*Micropterus salmoides*) densities have been found to be much higher in vegetated reservoir sites than in areas devoid of vegetation. Sunfish and Largemouth Bass often dominate larval and juvenile age classes in surveys of vegetated sites and larger individuals have been associated with aquatic plants. Studies have shown that total aquatic vegetation coverage within the range of 10 to 40% is considered optimal for growth and survival of fish species that rely on vegetation to fulfill components of their life history. Total aquatic vegetation coverage >20% is also desired for Largemouth Bass recruitment. In addition, optimal aquatic vegetation density provides edge habitat preferred by ambushing Largemouth Bass, resulting in increased angler catch rates when targeted. Largemouth Bass are the most sought-after sport fish in Texas and angling for this species accounts for about half of all freshwater fishing economic expenditures (i.e., estimated $480,000,000 per year). However, high coverages of hydrilla

(>40%) can negatively affect open-water sport fishes. In reservoirs with popular fisheries for catfishes, crappies, and temperate basses, high densities of hydrilla may be unfavorable for these angler groups.

Most large reservoirs in Texas were built in the 1950s and 1960s. As these reservoirs age, habitat in the form of standing timber and brush inundated at the time of impoundment decomposes, often resulting in a concomitant decline of some sport fisheries. Hydrilla was first documented in Texas in the mid-1970s. In many Texas reservoirs, hydrilla became established and eventually replaced woody habitat as the predominant habitat type. Fisheries management surveys have indicated Largemouth Bass fisheries responded positively to this new habitat, often leading to a resurgence in directed fishing effort for the species (e.g., Sam Rayburn Reservoir, Toledo Bend Reservoir). Because conditions in many Texas reservoirs are not suitable for native vegetation to grow at levels to impact Largemouth Bass populations; hydrilla may provide the only aquatic vegetation habitat available for Largemouth Bass, which is valued by many anglers.

While hydrilla often offers quality habitat for Largemouth Bass, it can impede access, reduce angler effort and catch rates, and create navigational hazards for boaters. Estimates of the corresponding level of total hydrilla coverage in a reservoir that results in negative effects to Largemouth Bass populations (e.g., decreased growth, lower body condition, lower abundance) range from 30-60%, with one study finding no negative effects on the species at coverage of 80%, although angler effort was significantly reduced at that level. Primary uses of the reservoir can also be impacted. For example, the Lower Colorado River Authority identified hydrilla as contributing to lost hydropower revenue when intake screens were clogged with hydrilla fragments, and hypothesized hydrilla decreased channel conveyance leading to increased flooding of waterfront homes on Lake Austin. Conversely, on many reservoirs there is often little or no concern about hydrilla becoming problematic given the propensity for limited shallow water areas, recurring cycles of droughts and floods, or high turbidity, all of which can limit hydrilla growth. Furthermore, many Texas reservoirs have no waterfront homes where access would be impeded or primary uses of the reservoir are generally unaffected by hydrilla (e.g., flood control).

At Texas reservoirs where homes line the banks, control of hydrilla has been at the heart of many controversies, typically pitting the desires of anglers against those of waterfront property owners (e.g., Conroe, Austin, Dunlap, McQueeney, Houston County). Bass anglers are often strongly opposed to large-scale aquatic vegetation control and express a belief that fisheries resources are sacrificed to appease waterfront property owners and other user groups. Anglers reference historic examples where triploid (i.e., sterile) Grass Carp (*Ctenopharyngodon idella*) were used as a control method and ultimately denuded the reservoir of all aquatic vegetation (e.g., Lake Conroe, Lake Austin, Lake Dunlap) as evidence that a balanced approach to aquatic plant management is difficult to achieve or maintain. Conversely, property owners' express beliefs that fishery resources are being protected at all costs without regard for factors such as shoreline-based access, property values, or quality of life of waterfront property owners. The dichotomy in perspective between these groups frequently places Inland Fisheries Division District Fisheries Biologists in a difficult situation. District Fisheries Biologists desire to maintain fish habitat offered by presence of hydrilla and other aquatic plants, while also being responsive to the concerns of diverse stakeholder groups. Reaching consensus among stakeholders on an approach that achieves control of hydrilla, while still maintaining sufficient aquatic vegetation coverage to support a fishery has proven difficult.

Hydrilla Treatment Techniques – Chemical, mechanical/physical, and biological control methods are available for treating hydrilla. These can be used separately or in combination. For small-scale treatments, chemical control with herbicides labeled for aquatic use are preferred and the most used

control method. Mechanical/physical control is considered more costly to implement and has been less frequently used to clear boating access areas. Furthermore, it is less preferred in most cases due to the potential for fragmentation to spread hydrilla to new areas. Of the three control techniques, the use of triploid Grass Carp as a biological control is probably the most controversial among anglers because their use requires careful balancing of the number of fish stocked against the coverage and species of aquatic vegetation present, and management objectives. As a result, their use may in some cases either have little effect or virtually eradicate all aquatic vegetation, including native aquatic plants, especially under changing environmental conditions.

Seasonal and Environmental Effects on Hydrilla Coverage – Seasonal hydrilla coverage typically reaches a peak in late-summer or early-fall and then declines during the winter. However, environmental conditions for aquatic plant growth may also change, which can have drastic effects on coverage. Periods during which water clarity remains relatively clear, sunlight penetration is high, and water levels remain stable generally provide good growing conditions for submerged aquatic plants. Under these conditions, total vegetation coverage may increase. Conversely, extended periods of high turbidity limit light penetration. Extreme high-water events can increase depth and keep sunlight from reaching the plants. High flows can scour the substrate and displace plants. Prolonged drought and drying of substrate can create conditions that result in large-scale declines in hydrilla coverage, or functional eradication, absent any treatment. For example, hydrilla was present in Lake Livingston 20 years ago, but turbid water, sedimentation, and wave action likely contributed to its eradication from the reservoir. In Toledo Bend Reservoir, hydrilla coverage was historically as high as 20,000 acres but is now at only a trace level; the reason for this decline may be related to increased turbidity from high rainfall events during the spring when hydrilla first starts growing. Hydrilla was abundant in Bob Sandlin Reservoir but is no longer present after several periods of drought. At Lake LBJ, hydrilla was treated with herbicides with little effect from 2014 to 2018 but a period of high, turbid water and scouring flows from a flood event in the Llano River (a major tributary) in late-2018 appears to have been responsible for reducing and potentially eliminating it from the reservoir.