REVIEW

Of

Wisconsin's Walleye Management Plan (1998)

Drafted by the Wisconsin DNR Walleye Management Team

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Introduction and background

Walleye are the epitome of a premier sportfish in Wisconsin and also support a robust tribal fishery. Current walleye management activities of the Wisconsin DNR have been guided by a plan completed in 1998. This plan was ambitious, detailed, and groundbreaking. It involved a considerable amount of analyses and public input. The goals and objectives developed in that plan were certainly highly relevant at the time and have largely served the Wisconsin walleye fishery well.

However, perhaps more so than any other species, walleye have been in flux in Wisconsin over the last two decades. Many of the most consequential current management issues, such as recruitment failure and climate change, were not included in the 1998 plan. There have also been great advances in our understanding of walleye through research, changes to stocking practices, and significant technological improvements that have improved how we collect and share information. Thus, many of the objectives and recommendations outlined in the 1998 management plan are accomplished or out of date, while other important topics are absent. Additionally, while the 1998 plan was statewide in scope, there are many management issues that are unique to "Great Waters" of the state, such as the Mississippi River, Lake Winnebago, Green Bay, Lake Superior, and Lake Michigan that were not given much consideration previously. Therefore, the DNR Walleye Team, consisting of WDNR, GLIFWC, and Wisconsin Conservation Congress representatives, has begun a process to update Wisconsin's Walleye Management Plan.

This document is a review of the work completed under the guidance of the 1998 Walleye Management Plan. It is intended to evaluate which management strategies from the old plan are still prudent and need to be included in the updated plan. This will also serve as a road map for updating goals, and possibly developing new ones.

How this review was completed

The 1998 Walleye Management Plan had a hierarchical structure that included broad **Goals,** more specific **Objectives**, and **Strategies** that would be used to meet those objectives, typically with products/results and groups who would work toward that strategy identified. There are a total of seven goals which are subdivided into 23 objectives and 55 strategies.

In this review, we list the goals and objectives at the start of each section, then comment specifically on strategies (*Look for italicized text preceded by the phrase, "Review Comments" throughout this document*). As a part of our review, we categorize each strategy as "Complete", "Partially complete/needs more work", "Incomplete", "Obsolete", or "Continuous/ongoing". At the end of each section we provide a summary statement about progress towards completion of the goal, how we view that goal as we approach updating the plan, and specific challenges we anticipate in that area as a part of the update process.

We also surveyed current WDNR fisheries biologists on various aspects of walleye management as it pertained to updating this plan. We received 39 survey responses representing a minimum of five staff from each management district. Those results are shown in the areas where they are most relevant and are denoted with this icon:

Goal 1: Protect, develop, maintain, and restore critical habitats for natural stocks of walleye and associated fish and aquatic communities.

Objectives
1.1 Identify critical walleye habitat statewide.
1.2 Ensure protection of critical habitats through various jurisdictions' water quality, shoreline, and watershed protection programs and permit processes.
1.3 Rehabilitate/enhance habitat and water quality in walleye waters.
1.4 Mitigate negative impacts of dams and hydro power operations on fish communities.

Strategies and Implementation for Objectives 1.1, 1.2, 1.3, and 1.4.
A. **Strategy:** Identify critical habitats on walleye waters through joint local and state efforts;
Product / Result: Number of waters surveyed for critical habitat. Development of handbook methodology for habitat evaluation. Creation of accessible database on habitat in Wisconsin waters.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Lake Organizations, Native American Tribes.

Review Comment: FM Handbook does not appear to offer the guidance that was prescribed here. In conversation with Paul Cunningham, this strategy was peripherally on track to be accomplished by the critical habitat designation program (an adaptation of the sensitive areas program), which would have identified important walleye habitats in addition to that for other species. That program was used more in some areas than others and did not reach its full potential.

New low-cost technology such as side scan sonar may be useful in accomplishing this strategy. See Richter et al. 2016. GLIFWC has mapped walleye spawning habitat on lakes within the Ceded Territory (http://maps.glifwc.org/) and the DNR's lakes program (Katie Hein) is doing nearshore habitat inventory both of which may partially satisfy some of this strategy and is certainly a good start towards a more unified statewide approach (these are both available in mapping databases). Another relevant project includes the Nearshore Substrate Inventory done by DNR teams in the Woodruff area. Partially complete/needs more work

B. **Strategy:** Manage aquatic habitats regionally within watersheds.
Product / Result: Incorporation of aquatic habitat management into water basin planning efforts and lake management plans. Integration of habitat management and fisheries management.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Water Division of DNR, Lake Organizations, Native American Tribes.

Review Comment: It is debatable as to the extent to which this is being done. Current fish management, water quality, and aquatic plant management plans often do not specifically address critical fisheries habitat needs, likely because of difficulty in determining those needs and implementing habitat projects. Work being done by other programs within DNR may be of use to fish managers but is not always readily available. Also, adding lake class into the

management picture would be a worthwhile part of the plan update that dovetails with this strategy. Partially complete/needs more work

C. **Strategy:** Rehabilitate or restore critical aquatic habitat, e.g., shoreline fish nursery and food production areas, spawning areas, etc.
Product / Result: Number of **rehabilitation/restoration** projects funded. Review and publication of habitat restoration methods and efforts.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Lake Organizations, Sports Clubs, Native American Tribes.

Review Comment: This strategy is huge in scope but light on details of what constitutes restoration and rehabilitation (or are the terms interchangeable for any kind of habitat improvement project?). More clarity may be needed in an updated plan. Partially complete/needs more work

One of the most common walleye habitat projects reported by staff was addition of spawning substrate (reefs) in lakes with declining or perpetually low NR. These kinds of projects were reported by 14 staff, with projects in Barron, Bayfield, Chippewa, Door, Douglas, Iron, Langlade, Marinette, Oconto, Oneida, Polk, Sauk, Shawano, Vilas, Waukesha counties. While these projects have been widely attempted and may be popular with the public, no clear-cut examples of successful improvement of natural reproduction were identified. In a review of walleye spawning reef enhancement projects that occurred in 20 northern Wisconsin lakes, Neuswanger and Bozek (2004) found that walleye reproduction had not increased in at least 85% of the study lakes. Spawning reef enhancement projects have shown some effectiveness in limited case studies where ecological conditions are favorable to walleye natural reproduction (LeBlanc et al. 2017, Hiawatha National Forest case studies). However, to be thoroughly evaluated for consideration in Wisconsin, it's recommended that a scientific study be designed to evaluate this specific habitat enhancement technique (also recommended in Neuswanger and Bozek 2004).

Projects with more demonstrated success were identified by staff and include improvements to marsh spawning areas on the Winnebago system, dam removals, water quality improvements, shoreline bank stabilization near spawning areas, and water level management programs. Identifying projects like these, that have a higher likelihood of positively impacting populations, should be an emphasis of the updated plan to guide the efforts of DNR staff and partners.

D. **Strategy:** Develop guidelines for aquatic habitat restoration and management including aquatic plant management.
Product / Result: Completion of a handbook on habitat restoration/management, including plant management.
Responsible Parties: Water Division, Bureau of Fisheries Management and Habitat Protection, Lake Organizations, Sports Clubs, Native American Tribes.

Review Comment: We feel this has not been accomplished in the context of walleye management. The closest thing that we have would be the Healthy Lakes Grant guidance and BMPs

(according to Paul Cunningham), which emphasizes overall aquatic health and is not specific to walleye. Linkages between plant management activities, including AIS control, and walleye populations are not currently well understood. Incomplete

Most staff responding to the survey indicated they did no walleye habitat surveys whatsoever. Through the survey we also learned that most habitat surveying being done is visual and qualitative, with no uniform guidance. This confirms our assessment that a standard practice for walleye habitat evaluation has not been completed. Furthermore, habitat surveys being completed largely focus on spawning substrate, and little work has been done to assess habitat for other important life stages (larval, juvenile, adult). Emerging research on thermal-optical habitat (Lester et al. 2004, Carpenter et al. 2017, Hansen et al. 2019) may need to be incorporated into how we view walleye habitat as well. Even assessments of spawning habitat, which appears to be the most common assessment currently being done by staff, would benefit from more standardized and quantitative methodology.

E. Strategy: Work with dam and hydro power interests through the **FERC** process to document impacts of hydro operations, and mitigate negative effects.
Product / Result: Number of studies completed; number of mitigation projects completed.
Responsible Parties: Water Division, Bureau of Fisheries Management and Habitat Protection, Dam Owners/Operators, Lake Organizations.

Review Comment: We feel this activity is currently being done by biologists involved in FERC relicensing and expect that to continue. However, there may be opportunities through the management planning process to outline a statewide approach for walleye management within the FERC relicensing process. There are also opportunities to highlight successes with previous FERC projects where "run of river" has replaced peaking and led to improvements in walleye populations. Continuous/ongoing

F. **Strategy:** Protect sensitive habitat areas from boat traffic through creation and maintenance of voluntary (perhaps) seasonal "no entry zones", utilizing local lake management organizations, conservation clubs, etc., to install signs and promote habitat protection.
Product I **Result:** Number of sensitive habitat areas established. This is a very important issue and some components of the problem should be addressed at the legislative level.
Responsible Parties: Local Governments, Bureau of Fisheries Management and Habitat Protection, Lake Organizations, Sports Clubs.

Review Comment: We are only aware of one area where this has been done specifically for walleye management purposes (spawning marshes in the Winnebago system). There are major social, political, and legal challenges to this strategy. We are also not aware of evidence suggesting that boat traffic has deleterious effects on walleye spawning success/recruitment. This strategy will need to be carefully considered to determine if/where it is appropriate for use. Seasonal fish refuges that are closed to fishing should also be considered within this strategy. Partially complete/needs more work

G. **Strategy:** Enforce Chapter **30** permits to protect shoreline spawning and nursery habitat.
Product I **Result:** Number of applications modified to protect spawning/nursery habitat.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Lake Organizations, Sports Clubs. Lake shore property owners.

Review Comment: We feel this is currently being done by individual biologists. However, changes to Chapter 30 permitting may be cause for concern (rip-rap becoming a general permit). Continuous/ongoing

H. **Strategy:** Develop/enforce shore and wetland zoning ordinances to protect lake shoreline and stream bank buffer areas and prevent improper overdevelopment in the watershed.
Product I **Result:** Development of shore and wetland zoning ordinances that protect critical areas.
Responsible Parties: Municipalities, Lake Organizations, Sports Clubs.

Review Comment: Changes at the state level have made local zoning laws (particularly in the north) less restrictive, so it could be argued that we have lost ground on this strategy. Creating and enforcing zoning laws falls outside the purview of DNR Fisheries, and so progress in this area may need to rely more on educating landowners on the importance of healthy lakes (see DNR's Healthy Lakes program) and working with partner groups. GLIFWC representatives report that individual tribes have systems for protecting on-reservation waters. Partially complete/needs more work

I. **Strategy:** Implement non-point pollution controls to improve water quality, especially in southern waters.
Product / **Result:** Number of Best Management Practices installed.
Responsible Parties: Wisconsin Department of Natural Resources, County and Municipal Governments.

Review Comment: Similar to the previous comment, creating and enforcing these kinds of laws falls outside the purview of DNR Fisheries, and so progress in this area may need to rely more on educating landowners and working with partner groups. However, we feel staff are aware of the importance of best management practices for water quality and are working to implement them where practical. There are many other partners interested in this area we could better engage with (UW Extension, Midwest Glacial Lakes Partnership, etc.). An updated plan should build on this strategy. Partially complete/needs more work

J. Strategy: Purchase critical habitats where necessary to ensure protection or enhancement.
Product I **Result:** Amount of critical habitat (from A.) in public/private ownership/protected from development. Public and Departmental support for the Wild Lakes Initiative is very important.
Responsible Parties: Land Division, Water Division, Bureau of Fisheries Management

and Habitat Protection, Lake Organizations, Sports Clubs. Lake shore property owners.

Review Comment: A more appropriate and specific strategy in this area might be to "identify and prioritize critical habitat for protection", which recognizes that protection does not necessarily require purchase, but could also include conservation easements. Partially complete/needs more work

Examples of land purchases or easements to benefit walleye were extremely rare in our staff survey. Of 39 staff surveyed, only 4 identified an example from their management area. Areas where purchases were made specifically to benefit walleye included:

- *St. Louis River*
- *Portions of Mason and Evergreen lakes in Flambeau River State Forest*
- *Wolf River and Upper Fox River*

Each of these projects is likely to be very impactful individually, so we do not want to downplay them. But overall, very little work has been done to obtain land protections to benefit walleye. We feel this area would benefit greatly from more specific methods to identify critical walleye habitat and better coordination among partner groups, including land conservancy groups.

K. Strategy: Utilize available public and private funds to identify management problems and solutions.
Product / Result: Number of cooperative/externally funded projects initiated/completed.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Walleye Management Committee, Lake Organizations and Districts, Sports Clubs. Lake shore property owners.

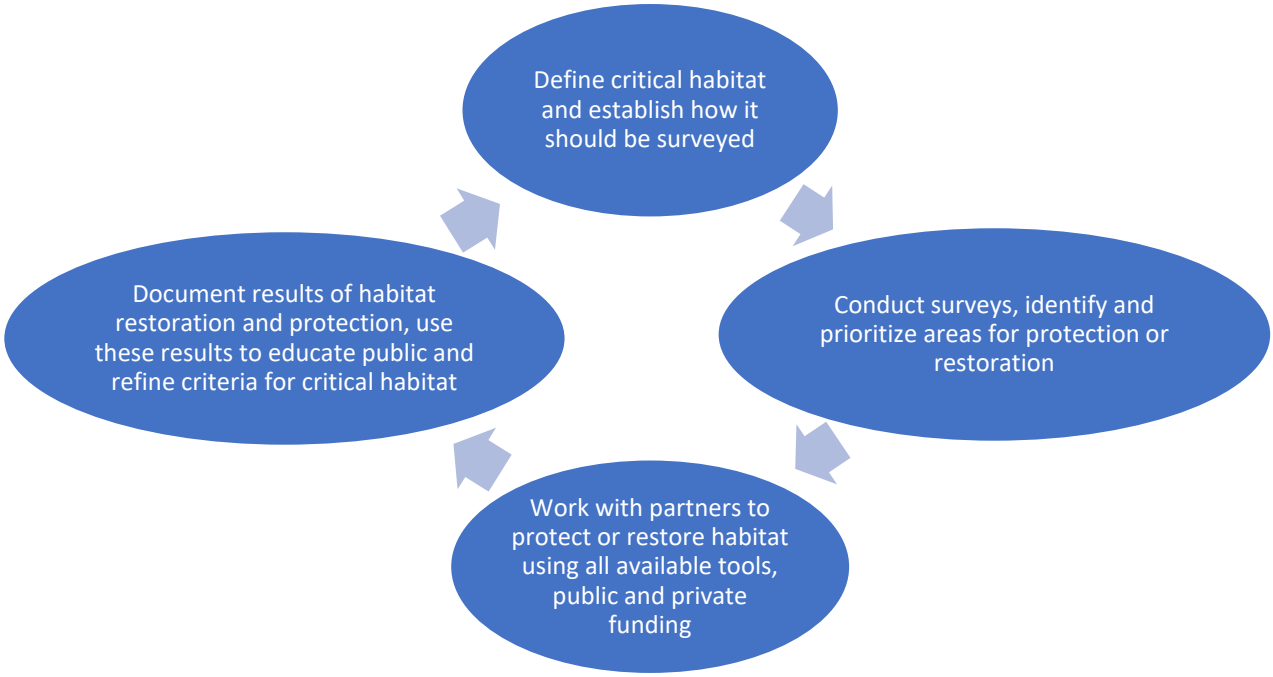
Review Comment: Developing the framework for these public x private partnerships will be a major component of the plan update process. Certainly, these partnerships are happening across the state, but in a patchwork manner. We may also need to better define how limited DNR warmwater habitat funds might be best used to improve walleye habitat, and/or find ways to supplement that funding. Aquatic Plant Management (APM) plans were identified as an opportunity to get private landowners focused on habitat. Partially complete/needs more work

L. Strategy: Implement a public information program on the identification and importance of aquatic habitat, especially related to maintenance of healthy walleye populations.
Product *1* Result: Development of a publication on the importance of habitat. Publication and distribution of educational materials to schools and publics.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Lake Organizations, Lake Districts, **UW** Extension, Sports Clubs.

Review Comment: It is unclear to the extent to which this was repeated, but even if successful, such efforts would need to be repeated generationally to be effective. Partially complete/needs more work

OVERALL REVIEW OF GOAL 1

This goal made clear that habitat was a very important consideration in the 1998 Walleye Management Plan. However, lack of specifics, often undefined scope, or strategies outside of DNR authority, may have limited progress towards many strategic areas. Similarly, there may need to be a concerted effort to pull together existing habitat survey/inventory work that is currently being done by various agencies and programs within DNR to provide resources that are directly targeted at fish management. The updated plan will undoubtably continue to place a lot of emphasis on habitat. More specifics will be needed to achieve success in this challenging area. Restructuring the strategies within the plan may also be useful for making incremental progress, rather than looking at each item compartmentally. Strategies for progress on habitat may need to follow more of a cyclical stepwise approach:



Goal 2: Provide a variety of opportunities for the catch and harvest of walleye (including harvest for food, tribal harvest, quality catch, and trophy opportunities).

Objectives

2.1 Establish walleye fishery objectives, and develop and implement management and regulation strategies based upon a statewide walleye waters classification system by 1997.

2.2 Provide diverse harvest and angling opportunities by 1997.

Strategies and Implementation for Objective 2.1 and 2.2

A. Strategy: Utilize a management classification model to set management objectives for walleye waters maintained primarily through natural reproduction: This classification model is based on the current status of the walleye population and on the characteristics of adult abundance, juvenile abundance, growth rates, and amount of fishing pressure. This classification represents a conceptual framework for walleye management goals and objectives.

Product 1 **Result:** Number of walleye waters classified/managed under the classification system.

Responsible Parties: Bureau of Fisheries Management and Habitat Protection, with public support.

Product 1 **Result:** Establishment of management objectives.

Responsible Parties: Walleye Management Planning Committee.

Review Comment: Several different classification models exist for walleye in Wisconsin that might partially satisfy this strategy. Populations within the Ceded Territory are classified based on reproduction. Waters across the state are classified based on stocking criteria. All walleye waters also have a lake class assignment. So we have several ways in which waters are classified, but additional work may need to be done to identify which classification systems are most relevant for management actions. *Partially complete/needs more work*

B. **Strategy:** For walleye waters that are maintained primarily through stocking, some of the same regulation categories are useful, but there is no relationship between the number of large walleye and the number of juvenile walleye, so the above model is not appropriate. Generally, densities of adults and juveniles will be much lower, from 2 **-3** adults per acre, but growth rates are usually high. Stocked waters are managed to 1) provide additional fishing opportunities for walleye, **2)** provide panfish control, **3)** augment intermittent natural reproduction, or 4) establish self-sustained populations. Therefore, minimum length limits are generally most suitable because they help to maintain moderate densities of adult walleye. Without at least moderate densities of adults, fishing would be poor, and panfish control would be ineffective.

Product 1 **Result:** Establishment of management objectives for stocked waters.

Responsible Parties: Walleye Management Planning Committee.

Product 1 **Result:** Number of walleye waters classified/managed under the classification system.

Responsible Parties: Bureau of Fisheries Management and Habitat Protection, with public support.

Review Comment: Unclear how to evaluate this, but a re-examination of the regulation toolbox is something we anticipate doing as a part of the plan update. Current regulation categories have options for Consumptive, Quality, Memorable, and Trophy opportunities, but are not specifically applied based on whether they are stocked or not, as was prescribed here. The Walleye Team is currently in the initial phases of beginning to evaluate the Walleye Stocking Initiative (WSI). The WSI is the first, large-scale, concerted effort of stocking large-fingerling (proven to have the highest survival rates amongst other Walleye stocking products; Kampa and Hatzenbeler 2009) Walleye in Wisconsin. By evaluating differing Walleye stocking rates across differing lake types, findings will provide the information necessary to establish better management objectives for stocked Walleye waters.

C. Strategy: Coordinate walleye management objectives and implementation of walleye management strategies with tribes in the ceded territory.
Product / Result: Coordination of management objectives with the Indian tribes of Wisconsin.
Responsible Parties: Treaty Fisheries Coordinator, Treaty Working Group, Administration.

Review Comment: Due to the nature of the tribal harvest system we feel this strategy is currently being employed and will be ongoing. However, the process of updating the management plan may provide opportunities to strengthen cooperation between state and tribal agencies. Outlining a process for setting joint management objectives for individual waters, establishing clear strategies for achieving those goals, and better defining roles that different agencies (and partner groups) would play would be productive. Continuous/ongoing

D. **Strategy:** Develop a regulation implementation process which allows greater flexibility and timeliness in responding with necessary actions to changing natural conditions.
Product / Result: Development of guidelines for flexibility in regulation implementation. Development and implementation of new procedures for adaptively managing waters.
Responsible Parties: Walleye Management Planning Committee, Bureau of Fisheries Management and Habitat Protection, Public, Conservation Congress, legislature.

Review Comment: It would be hard to argue that the regulation change process has gotten timelier since creation of the 1998 plan. Act 21 added several steps onto the normal regulation change process which leads to less timely regulation changes for walleye and other species. As such, this strategy has not been successfully implemented, but of course, this process is much larger than just walleye management and would require legislative action to make structural changes to the timeline for instituting fishing regulation changes. Incomplete

E. **Strategy:** Periodically review angler preferences and attitudes through survey methods that identify the various angler and public groups that are important to the status of the fisheries, so that public input into walleye management is maintained.
Responsible Parties: Walleye Management Planning Committee, Bureau of Fisheries

Management and Habitat Protection, Public.
Product / Result: Survey angler attitudes and preferences every 5 to 10 years.

Review Comment: Public input that would encompass preferences and attitudes related to walleye are conducted periodically by DNR. The update to this management plan will provide an opportunity to summarize past angler surveys and gather considerable amounts of new data on issues related to walleye management. Online surveys developed as a part of this plan update could theoretically be administered periodically for little cost, an option that was not available in 1998. Partially complete/needs more work

2.3 Better define the impacts of various levels of exploitation on walleye populations and fisheries by 2010.

Strategies and Implementation for Objective 2.3
A. **Strategy:** Examine impacts of sustained exploitation at different levels (0-50%) on natural walleye populations and aquatic communities.
Product / Result: Report on an evaluation of sustained harvest by 2010.
Responsible Parties: Bureau of Integrated Science Services, Bureau of Fisheries Management and Habitat Protection, Walleye Management Planning Committee.

Review Comment: Considerable work has been done in this area. See Sass and Shaw 2018, Tsehaye et al. 2016, Embke et al. 2019, WDNR and GLIFWC unpublished data on Sherman Lake. While we rank this strategy as Complete, we also recognize that it is of enough importance that examinations of exploitation should be ongoing and new findings should be factored into future management. Harvest of juveniles was identified as a specific area of interest.

2.4 Manage walleye stocks to maintain harvestable populations with a minimum of 5 year classes represented in the spawning stock and a minimum of 3 adults per acre.

Strategies and Implementation for Objective 2.4
A. **Strategy:** Implement walleye management program based on Wisconsin Walleye Waters Classification System (see Objective 2.1) by 1997. Survey representative sample of walleye waters annually.
Product / Result: Occurrence of 5 or more adult year classes in 80% of lake surveys of natural walleye populations. Development of survey guidelines for sampling a subset of waters annually. Update current sampling protocols in handbook.
Responsible Parties: Regional fisheries and habitat staff, Bureau of Fisheries and Habitat Protection.

Review Comment: This particular strategy is not being used in the exact way specified here, which is likely just a reflection of how our methods for classifying populations has evolved. However, the survey portion of this strategy is still largely relevant. Using updated models for classifying walleye populations seems more attractive. Partially complete/needs more work

OVERALL REVIEW OF GOAL 2

Some strategies within this goal are largely met simply by the existence of cooperative management of walleye within the Ceded territory and the vast amount of data collection, classification, and research associated with that system. Other means of classifying walleye waters may be outdated and could be replaced by more contemporary methods (e.g. lake class). Regulations will continue to be an area of intense interest among anglers and managers. Examining our current toolbox and how regulations are applied across the landscape will certainly be an integral part of updating the walleye management plan.

We asked staff whether they felt the current regulations toolbox met their needs, or whether they would like to see "small changes to toolbox options (i.e. moving minimum length limit cutoffs or slots.)" or "big changes to toolbox options (i.e. adding toolbox options or making major changes to existing options.

The most common response from staff (49%) was that the current toolbox met their needs, while 40% indicated an interest in seeing small changes, and 11% indicated an interest in seeing big changes. These results suggest that DNR staff do not see a complete overhaul of walleye regulations as necessary (though the public may disagree). Still, DNR biologists indicated there may be room for improvement with certain regulation (the 18" minimum, 3 daily bag limit was highlighted as an example). We plan to ask targeted questions to the public about regulation preferences as a part of the plan update.

Goal 3: Ensure that adequate information on the status and trends of walleye populations, fisheries, and angler preferences is consistently available for decision-making.

Objectives

3.1 Maintain comprehensive, up-to-date statewide information on walleye populations and fisheries, and their associated aquatic communities and habitats.

Strategies and Implementation for Objective 3.1

A. Strategy: Implement statewide survey design that adequately samples walleye abundance, harvest rates, and major aquatic community trends of waters within the various walleye management categories for future decision making.
Product / Result: Continue to conduct walleye populations assessments and creel surveys annually on a representative sample (15-30 annually) of walleye waters. Survey each major water at least once each 10 years, and more frequently if possible.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, GLIFWC, University System.

Review Comment: We feel this strategy is being accomplished by the current protocol and sampling effort. One exception to that might be perch sampling in inland lakes. Perch are an important prey item for walleye and better understanding of trends in perch populations may be useful for walleye management. Complete

In our staff survey, 64% of respondents felt that the current walleye sampling protocols provided the data they need to manage walleye effectively, while 36% said they did not. Suggested areas where protocols could be improved included expanded use of genetic tools and protocols for rivers and large flowages.

B. **Strategy:** Conduct comprehensive fish community and habitat surveys on a sufficient number of representative walleye waters annually.
Product / Result: Conduct comprehensive fish community and habitat assessments annually on a representative group of waters (10 annually).
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, GLIFWC.

Review Comment: We are meeting this target for comp fish surveys. Continuous/ongoing See earlier comments on habitat surveys, which may require more work. Partially complete/needs more work

C. **Strategy:** Conduct index surveys on a sufficient number of walleye waters annually.
Product / Result: Conduct comprehensive index surveys annually on a range of Wisconsin waters (10-30 annually).
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Great Lakes Indian Fish and Wildlife Commission, lake organizations.

Review Comment: We are meeting this target for index fish surveys. Continuous/ongoing

D. Strategy: Use volunteers (clubs, lake organizations, etc) for collection of long term fishery and habitat data.
Product / Result: Develop volunteer sampling programs, with guidelines and forms (at least one lake in each basin during each biennial planning cycle).
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Lake **Organizations/Districts,** Sport Clubs, Property Owners, Resort Associations, Guides.

Review Comment: It is somewhat unclear as to what was intended with this strategy. Some field crews utilize volunteers to help complete surveys. But this strategy may refer more to using volunteers to collect additional data that would not otherwise be collected by DNR. Either way, the updated plan can work to identify where volunteers might be able to help fill staffing or data collection gaps. Partially complete/needs more work

We asked staff whether they currently use volunteers to assist with data collection related to walleye. Our staff indicated that volunteers are used in a range of ways, including recapture data in tagging studies, field help for netting or shocking, and cooperative stocking programs (including walleye wagons). Many staff commented that having the public assist with fieldwork is generally more beneficial from a PR or outreach standpoint than as a critical means to complete work. Angler diary/log surveys were also brought up as a way to incorporate volunteers, especially in areas where DNR creel surveys are not common.

E. Strategy: Include public input in decision to change management goals on a particular water.
Product / Result: Revision of management handbook and guidelines.
Responsible Parties: Regional fisheries biologists, lake organizations, anglers, Native American Tribes, Bureau of Fisheries Management and Habitat Protection.

Review Comment: We feel this is being accomplished, but may not be conducted uniformly. A recent effort by the Stakeholder Engagement Team within DNR Fisheries examined public input through many of our processes and made recommendations. Some of those recommendations would further this strategy. If possible, an updated plan could more clearly define the public input process for all areas of walleye management. Partially complete/needs more work

OVERALL REVIEW OF GOAL 3

The general attitude among staff is that the current WDNR sampling protocols are appropriate for walleye and generate the data needed for management. However, there is no discussion of or target numbers for fall recruitment surveys which provide critically important information. An updated plan should detail the importance of those surveys and may need to establish target numbers for completion annually.

Also related to surveying, there is a disparity between the Ceded Territory and the rest of the state, especially when it comes to creel data (though that is being recently addressed to some degree). In general, recruitment and recruitment failure are not covered in the 1998 plan, despite likely being the biggest issue currently facing the Wisconsin walleye fishery in northern Wisconsin. This could easily become its own section altogether in an updated plan, given the importance of the issue.

Research is surprisingly not mentioned much within the 1998 plan despite being a key part of management. An updated plan should reflect the importance of research as a means to fill critical information gaps.

Other components of this goal relate to how we interact with the public and involve them in management. The plan update will provide an excellent opportunity to more clearly define those processes including how we can incorporate modern technology.

Goal 4: Maintain the genetic integrity of naturally reproducing walleye populations.

Objectives
4.1 Determine if there are performance benefits to genetically distinct stocks and develop a propagation program that incorporates these benefits.
4.2 Examine the extent of the walleye stocking program historically, what it's effects have been on genetic integrity of walleye and where stocks have originated from.
4.3 Insure walleye stocking does not have a negative impact on lakes with natural reproducing walleye populations and make recommendations on when to stock in waters with natural reproduction.

Strategies and Implementation for Objectives 4.1, 4.2 and 4.3.
A. **Strategy:** Identify self-sustaining walleye populations to be maintained and preserved.
Product / Result: Identification and listing of self-sustaining walleye populations.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Great Lakes Indian Fish and Wildlife Commission, Native American Tribes.

Review Comment: We feel these data exist and research on the genetic structure of Walleye stocks in Wisconsin has been completed (Bootsma unpublished thesis). The Wild Walleye Waters Initiative also fits within this strategy. Continued efforts should be made to identify and preserve genetically-unique Walleye stocks that are also self-sustaining. Complete

B. **Strategy:** Complete ongoing walleye genetics study for Wisconsin and use results in review of historic and future stocking practices by 1998.
Product / Result: Utilize study results in the establishment of stocking criteria that maintain and enhance the genetic integrity of Wisconsin walleye populations. Develop report describing distribution of genetic variation and stock structure.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Walleye Management Stocking Subcommittee, tribal, federal, private producers.

Review Comment: We feel that this strategy has been effectively integrated into our management by completion of necessary studies (Dembkowski et al. 2018, Hammen and Sloss 2019; Bootsma unpublished thesis) and updated stocking practices that resulted. Complete

C. **Strategy:** Summarize historic walleye stocking data and use results to help set up stock performance project. Potential broodstock lakes should have historic data examined to determine impact on study design.
Product / Result: Produce stock performance project report and identify potential broodstock lakes.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Walleye Management Stocking Subcommittee, tribal, federal, private producers.

Review Comment: This stock performance project seems to have been a big area of emphasis in the 1998 plan. It seems this was never completed. Regardless, use of native, in-basin genetics is now the overwhelming recommendation of geneticists, making this strategy largely obsolete. Still, there is interest in better understanding performance of stocked fish as it relates to

genetics. Some work related to this topic is ongoing (Zach Lawson project), but more coordinated efforts or future research projects could come out of the updated plan. Incomplete

D. **Strategy:** Develop and conduct performance studies on various stocks.
Product / **Result:** Develop study team to address issues such as study design, funding, personnel, commitment and propagation facilities
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Walleye Management Stocking Subcommittee, tribal, federal, private producers.

Review Comment: See above comment. Obsolete

E. Strategy: Classify all walleye waters as either having populations sustained through stocking or by natural reproduction.
Product / **Result:** Develop guidelines for classification system of other state waters. This classification should reflect management goals for future management of the walleye stock within the water. Develop specific definitions of naturally reproducing waters.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Walleye Management Stocking Subcommittee, tribal, federal, private producers.

Review Comment: Data exists to complete a classification of all walleye waters, but to our knowledge, the only reproduction classification exists for waters within the Ceded Territory where populations are classified by a recruitment code; this system code possibly be applied to all state waters. Updated walleye stocking guidance establishes criteria for classifying lakes into stocking prioritization categories and what scenarios justify stocking. However, further updates to that guidance may be necessary as a part of the plan update. Partially complete/needs more work.

F. **Strategy:** Implement interim stocking guidelines to protect existing genetic strains until performance studies complete. Base these on proposed genetic stock boundaries but exclude landlocked put, grow and take lakes.
Product */* **Result:** Development of interim guidelines for stocking.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Walleye Management Stocking Subcommittee, tribal, federal, private producers.

E. 1. Waters with walleye populations sustained through natural reproduction should not be stocked except under unusual circumstances..

E.2. Natural reproducing waters with unusual circumstances requiring stocking, such as a declining fishery, if stocked, should take broodstock from same water body.

E.3. Drainage lakes or rivers with populations maintained by stocking should use a regional stock at all times.

E.4. Stocking with the objective of restoring natural reproduction should use brood source from the same watershed and from a similar type of lake or river.

E.5. Landlocked lakes with no natural reproduction should use a regional stock whenever possible.

E.6. Proposed stock boundaries are the Lake Superior, Lake Michigan including the upper Fox, Upper Mississippi (includes Wisconsin, St. Croix, Chippewa),

Mainstem Mississippi Drainage (to first barrier on tributaries) and Rock Drainage.

Review Comment: We feel our walleye stocking guidance has advanced past this point but still adheres to the main concepts. An updated plan would certainly reference best-practices for walleye stocking and would complement our DNR stocking guidance. Complete

G. Strategy: Use population objectives for optimum number of year classes in a walleye population to help make stocking decisions. Discontinue stocking program if natural reproduction meets the management goals for the water. A management plan may include mitigation for habitat loss and regulation changes as well as stocking.
Product *1* Result: Revision of management handbook and guidelines.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Regional fisheries biologists, Walleye Management Stocking Subcommittee, tribal, federal, private producers.

Review Comment: See above comment. Complete

H. Strategy: A mechanism must be developed to provide private producers with access to any and all strains identified as important to maintain genetic integrity of natural populations.
Product *1* Result: Department review of possible mechanisms for providing fish to the private sector.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Walleye Management Stocking subcommittee, other producers.

Review Comment: Aquaculture Bill helps satisfy this strategy. Complete

OVERALL REVIEW OF GOAL 4

Walleye stocking is one of the most structured activities within the DNR Fisheries program and several studies have advanced our understanding of stocking effectiveness since 1998. Existing guidance satisfies many of the strategies outlined in this plan. The stock performance study that is referenced by several sections of the 1998 Plan represents a mostly obsolete view of how to stock fish. Today's stocking emphasizes native genetics, but there is still much to learn about the importance of stocking source. There are several emerging issues that need to be addressed in this section as a part of an updated plan, including: the Walleye Stocking Initiative and how those results will be used to modify stocking strategy, overall cost-effectiveness of stocking, performance and reproductive potential of stocked fish in rehabilitation scenarios, and broodstock source selection.

This goal had the largest percentage of items that were either complete or obsolete, suggesting that major updates are needed to make objectives and strategies more relevant for present day.

Goal 5: Provide educational opportunities to develop an appreciation for the fisheries resources of Wisconsin and to promote realistic angling expectations based on the productivity of the waters.

Objectives

5.1 Maintain pro-active public involvement program in management of Wisconsin's walleye waters.
5.2 Improve public understanding of walleye biology and management options for Wisconsin's walleye waters.

Strategies and Implementation for Objectives 5.1 and 5.2
A. Strategy: Hold an annual meeting of the Walleye Management Planning Committee each year to review the progress of plan implementation, make necessary recommendations for implementation priorities, address new issues, and to maintain involvement of this diverse group of walleye interests in statewide walleye management.
Product / Result: Hold annual meeting to review progress of plan implementation.
Responsible Parties: Walleye Management Planning Committee, Regional fisheries biologists.

Review Comment: If this happened at all it certainly isn't something that has been carried through to present day. The Walleye Management Team with WCC and GLIFWC representation may meet the functional needs of this strategy. Obsolete

B. Strategy: Form a Walleye Public Relations and Information Subcommittee (including members of the Planning Committee) to implement public relations and information activities to promote sound management of Wisconsin's walleye stocks and improve public understanding of walleye biology and management.
Product / Result: Subcommittee on Public Relations and Information formed.
Responsible Parties: Walleye Management Planning Committee, Public Relations and Information Subcommittee.

Review Comment: See above, some of this role filled by Office of Communications or Fisheries Communications LTE. GLIFWC also does fantastic outreach work. Obsolete

C. Strategy: Produce a statewide publication describing the Wisconsin Walleye Management Plan that includes a summary of the plan, the Walleye Waters Classification System, walleye life history, typical walleye fisheries, realistic expectations for Wisconsin's walleye fisheries, etc.
Product / Result: Statewide publication completed and distributed.
Responsible Parties: Walleye Management Planning Committee, Public Relations and Information Subcommittee.

Review Comment: A reasonable strategy that could be used again on the update. There may be some interest in producing an updated "Wisconsin Walleye Waters" booklet that reflects current status of walleye populations (last updated in 1995). Partially complete/needs more work

D. Strategy: Utilize news releases to highlight completion of walleye management plan, and, over time, implementation of various recommendations from the plan.
Product / Result: Complete new releases as needed to promote the plan and its implementation.
Responsible Parties: Walleye Management Planning Committee, Public Relations and Information Subcommittee, Regional fisheries biologists.

Review Comment: A reasonable strategy that could be used again on the update. Complete

E. Strategy: Work with television (Outdoor Wisconsin, other fishing shows, etc.) to describe the walleye management issues.
Product / Result: Completion of a TV special or spot.
Responsible Parties: Walleye Management Planning Committee, Public Relations and Information Subcommittee.

Review Comment: May not be necessary for an update to a plan. Obsolete

F. Strategy: Produce a statewide walleye management newsletter and/or walleye management handouts for distribution to interested publics through bait shops, resorts, fishing clubs, tribal functions, Chambers of Commerce, etc.
Product / Result: Produce a walleye newsletter **(see** also C.).
Responsible Parties: Walleye Management Planning Committee, Public Relations and Information Subcommittee.

Review Comment: Interesting idea, but this seems unlikely to sustain itself. Could use existing publications like the Fishing Forecast. Obsolete

G. Strategy: Develop walleye management element for use in the Angler Education Program. Include a focus on middle and high school education programs.
Product / Result: Completion of a walleye element for the Angler Education Program.
Responsible Parties: Walleye Management Planning Committee, Public Relations and 1nformation Subcommittee.

Review Comment: Team will review whether this has been incorporated into the Angler Ed program and determine if more action is needed. Partially complete/needs more work

OVERALL REVIEW OF GOAL 5

The outreach strategies that accompanied the 1998 plan were well-suited for the times and for the production of a major statewide plan. We will plan outreach surrounding this update that is appropriate to the scope of the product and utilizes the currently available tools. Outlining how we will share updates on accomplishment of plan objectives could be a valuable discussion to have with stakeholders. Do they want to hear those updates? What's the best way to reach them?

Goal 6: Develop a biologically sound and cost-effective walleye stocking strategy for Wisconsin waters.

Objectives
6.1 Examine the cost effectiveness and efficiency of current walleye propagation and stocking practices and make recommendations for future operations by 2005.

Strategies and Implementation for Objectives 6.1
A. Strategy: Form a Walleye Stocking Subcommittee to review walleye propagation and stocking practices and make recommendations on quantity and quality of walleyes propagated and when and where walleye should be stocked by 1998.
Product / Result: Review of current stocking guidelines and establishment of new stocking criteria by 1998. Incorporation of genetic studies into stocking guidelines.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Walleye Management Planning Committee, Stocking subcommittee, tribal, federal, private producers.
6.2 *Develop a walleye stocking plan that has stocking rates and sizes that insure the most cost-effective stocking strategy for fisheries management.*
6.3 *Insure DNR propagation system uses the most efficient propagation and distribution techniques.*
6.4 *Identify types of waters where stocking is successful, base stocking decisions on the biology of the system and incorporate the best survey information in walleye stocking decisions.*
6.5 *Determine the relationship between stocking and angler demand and insure stocking policies incorporate angler needs for stocked walleye waters.*
6.6 *Determine the effects of walleye stocking on existing fisheries community integrity and attempt to minimize negative impacts on existing communities.*

Review Comment: We assume this was completed and changes were recommended. Walleye stocking has been ever-evolving since the 1998 plan. Complete

Strategies for objectives 6.2, 6.3, 6.4, 6.5 and 6.6
A. Strategy: Develop sound biological criteria for all stocking.
Product / Result: Revise Fisheries Management Handbook stocking criteria by 1998.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Walleye Management Stocking subcommittee, other producers.

Review Comment: We feel our current criteria satisfy this. Complete

B. **Strategy:** Establish a survey and database system which provides managers with sufficient access to data and information to make sound biological decisions.
Product / Result: Revise and establish survey and database system by 1999.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Walleye Management Stocking subcommittee, other producers.

Review Comment: This has been completed. Complete

C. Strategy: Establish management goals by lake including stocking strategies and public input.
Product / Result: Revise and establish survey and database system by 1999.
Responsible Parties: Regional Fisheries and Habitat Management staff, Bureau of Fisheries Management and Habitat Protection, lake organizations, Native American tribes.

Review Comment: This strategy describes a system more similar to that of other states. While stocking decisions are made on a lake-by-lake basis, we do not always have defined management goals and public input into stocking is not formalized. Considerable discussion would need to be had about how to incorporate those two large changes, but that could be a part of updating this plan. Incomplete

D. Strategy: A mechanism must be developed to provide private producers with access to any and all strains identified as important to maintain genetic integrity of natural populations. The Department of Natural Resources should explore the possibility of providing fish to the private sector for propagation purposes.
Product / Result: Department review of possible mechanisms for providing fish to the private sector.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Walleye Management Stocking subcommittee, other producers.

Review Comment: Aquaculture Bill satisfies this. Complete

E. Strategy: Compile and analyze data from successful walleye stocking situations and apply to other waters.
Product / Result: Develop a critical review and analysis of past and current stocking evaluations.
Responsible Parties: Regional fisheries staff, Bureau of Fisheries Management and Habitat Protection, other producers.

Review Comment: Studies such as (Kampa and Hatzenbeler 2009; Jennings et al. 2005; Kampa and Jennings 1998) satisfy this, though there is certainly more to learn. We also expect that the results of the Walleye Stocking Initiative will advance our understanding of walleye stocking. Continuous/ongoing

F. Strategy: Need to maintain flexibility in size and age of walleye available for stocking to assure that we use the most cost effective techniques for producing walleye fisheries.
Product / Result: Review and revise stocking guidelines to maintain flexibility.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, other producers.

Review Comment: Our current system maintains some flexibility in products we can stock. Continuous/ongoing

G. Strategy: Use the latest information on stocking practices to insure stocking success is not limited by how the fish are stocked. For example, within practical limits, walleye should be stocked at water temperature less than 70°F.
Product / Result: Review and revise guidelines as new information is available.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, other producers.

Review Comment: Studies such as (Kampa and Jennings 1998) satisfy this, though there is certainly more to learn. The Walleye Initiative is another chance to advance our understanding. Continuous/ongoing

H. **Strategy:** The Department of Natural Resources should complete an evaluation of the cost effectiveness of stocking normal production fingerlings vs. extended growth fingerlings.
Product / Result: Review and analyze stocking evaluations of extended growth fingerling stockings.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, other producers.

Review Comment: Complete, see (Kampa and Hatzenbeler 2009). Complete.

I. **Strategy:** Summarize the cost effectiveness of stocking walleye.
Product / Result: Review and summarize current information on cost effectiveness of stocking by December 1998.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, other producers.

Review Comment: This remains an important item as long as stocking demand is high. We expect to obtain considerable amount of data on cost-effectiveness through the Walleye Stocking Initiative evaluation. Public input on what is an acceptable cost per recruit could be valuable to guide our stocking program and should be gathered as part of the planning process. Continuous/ongoing

J. Strategy: Do not introduce walleye into established non-walleye communities waters, unless impacts have been evaluated through an Environmental Impact Statement.
Product / Result: Revise guidelines for walleye introductions.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, other producers.

Review Comment: This is reflected in the current walleye stocking guidance. Continuous/ongoing

K. Strategy: Summarize all existing data on walleye interaction with other species.
Product / Result: Produce report on walleye interactions.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, Bureau of Integrated Science Services.

Review Comment: This has been an area of interest over the last 15 years. Several studies have helped to advance our understanding of this issue and research is ongoing. This is likely to remain a hot button issue with stakeholders. Continuous/ongoing

OVERALL REVIEW OF GOAL 6

Many of the strategies within this area have been effectively integrated into our program and the studies called for have been completed or are currently being conducted. It seems likely that the three stocking-related goals (of which this is one) could be condensed in an updated plan, considering the progress made on many of these strategies. Still, stocking is likely to be a very high-priority issue with stakeholders.

Goal 7: Ensure an integrated propagation program incorporating state, federal, tribal, private, and cooperative producers.

Objectives
7.1 Define the role of state, private, federal, tribal and cooperative providers and insure economic impacts on providers are understood.
7.2 Develop feedback mechanisms to private and public providers and assure all providers use the same terminology and consistent stocking policies.
7.3 Increase public understanding on the real benefits of stocking.

Strategies and Implementation for Objectives 7.1, 7.2 and 7.3
A. **Strategy:** Base stocking standards on biological standards. Develop a public input system to help develop these standards.
Product / Result: Revise guidelines and standards for walleye stocking in management handbook.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, other producers.

Review Comment: The biological standards have been well-established for stocking (see DNR Walleye Stocking Guidance and Walleye Recruitment Success Index), but we lack a public input mechanism outside of WCC representation on teams developing stocking guidance. Partially complete/needs more work

B. **Strategy:** Require reports on stocking are provided by the managers to either the public, private or tribal producer.
Product *1* Result: Revise guidelines and standards for walleye stocking in management handbook.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, other producers.

Review Comment: We have several ways this is communicated to the public, including online reports. Complete

C. **Strategy:** Develop a system for public feedback on stocking effectiveness.
Product / Result: Meet with local publics to get feedback on angler satisfaction with walleye fishing in specific waters.
Responsible Parties: Regional fisheries biologists, Bureau of Fisheries Management and Habitat Protection, Conservation Congress.

Review Comment: We are not sure if or how this was implemented after the 1998 plan was finalized. An analysis of creel data may be a more objective means to determine how stocking translates to fishing success. Incomplete

Staff reported that feedback from the public on perceived stocking success is very informal, sporadic, and likely biased (very few report that stocking is not working, they only call or email when they believe they are catching stocked fish). This result may highlight the challenges inherent to using public feedback for evaluations, especially when more objective, standardized approaches like creel data and angler diaries could be developed.

D. **Strategy:** Develop standards for fish importation for stocking.
Product / **Result:** Revise guidelines and standards for fish importation in management handbook.
Responsible Parties: Bureau of Fisheries Management and Habitat Protection, other producers.

Review Comment: This process is established and managed by DATCP. Complete

OVERALL REVIEW OF GOAL 7

Items within this goal are all related to stocking, but were broken out into their own section despite not all being closely related to each other. Several strategies are related to how the public gives input to stocking decisions, which is a worthy area of discussion. Our current system allows for some input on creation of stocking guidance or large stocking plans (e.g. Walleye Stocking Initiative), but does not always involve the public on decisions about individual lakes. While we certainly understand the external appeal of allowing more of that, it will be tricky to balance public and political input to stocking with biological standards. We expect this conflict will be featured in the plan update process and education of stakeholders on stocking realities was brought up frequently by staff as a challenging issue that needs to be addressed.

SUMMARY OF ACCOMPLISHMENTS

Goal#. Keyword	# rated Complete	# rated Partially Complete	# rated Continuous/ Ongoing	# rated Incomplete	# rated Obsolete
1. Habitat	0	9	2	1	0
2. Opportunities	1	3	1	1	0
3. Data and Information	1	3	2	0	0
4. Genetics	5	1	0	1	1
5. Outreach	1	2	0	0	4
6. Stocking cost	5	0	5	1	0
7. Stocking coordination	2	1	0	1	0
TOTAL	15	20	10	5	5

CURRENT TOPICS NOT ADDRESSED BY 1998 PLAN

The Walleye Team and DNR FM staff have identified the following topics that were not addressed in the 1998 plan (or comments earlier in this review) that are pertinent to current management and should therefor be considered and discussed as a part of updating this plan (in no particular order):

- Season structure and year-round fishing opportunities
- Interest in protection of large female walleye
- Sex-ratios of naturally reproducing and stocked populations
- Best practices to restore natural reproduction
- Tributary spawning
- Yellow perch abundance/recruitment
- Managing public expectations surrounding stocking and what to do when restoration stocking efforts fail to produce results
- Inclusion of sauger in plan
- Exotic species issues (zebra mussels, smelt)
- Walleye wagons
- Prioritized research needs

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