Wisconsin Department of Natural Resources

Fish Age Estimation Survey Results

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An online survey was created to assess current protocols, practices, and needs related to estimating fish age and applying knowledge of fish population age structure to fisheries management decisions. The survey was available online to Wisconsin Department of Natural Resources (WDNR) Fisheries Management and Research staff from September 29 to November 7, 2010 (Appendix 1). This report summarizes the results of the survey. Responses to questions are tabulated starting on page 4.

Survey responses were received from 37 field offices in Wisconsin (Question 1). For the purposes of this survey, responses are assumed to be representative of the state. Multiple survey responses were received from offices in Hayward, Sturgeon Bay, Antigo, Peshtigo, and Milwaukee. Multiple responses from individual field offices were merged into a single response per field office (except for Hayward, which were too disparate to be merged), for a total of 38 responses. Fisheries biologists and technicians were the most frequent respondents (Question 2). Age estimation is an important component of fishery surveys conducted throughout the state, with most respondents selecting “sometimes” (55%) or “always” (45%) in reference to Question 3, *How frequently do fish population surveys in your area include an age component*? No one selected “never” as a choice for this question.

Hard structures were more frequently collected from walleye, followed by largemouth bass, smallmouth bass, muskellunge, and northern pike (Question 4). Scales were the most common structure used overall. Scales were most often pressed on acetate and then projected (Question 5). Otoliths were most often prepared as thin sections or cracked (Question 6). Immersion oil was commonly used for clarifying otoliths. Transmitted light was commonly used, followed by reflected light, and then fiber optics. Of the 12 respondents who selected transmitted light, seven also selected reflected light, which suggests that both light sources are used or different light sources are used for different species or life-stages. Unfortunately, the question was not written to clearly assess specific techniques by species and life-stage.

Most respondents who selected thin sectioning as a method for preparing otoliths used transmitted light (29%), but did not sand or polish (59%) or specify use of a visual enhancement such as immersion oil (47%). Of the 17 respondents who selected thin section as a technique for otolith preparation, six also selected crack or whole as a preparation method for otoliths. Therefore, generalizations about light source, visual aids, and sanding may or may not be specific to thin sectioning methods. Of the 31 respondents who described processing fin rays and spines, most used transmitted light (55%), used some form of oil, glycerin, or water (~65%), and did not sand or polish (74%). Assessment of precision of age estimates was used by about half of the respondents (Question 9), with the most common method being double-blind independent readings within the same field office (Question 10). Most readers (79%) had access to length and weight information when estimating age (Question 11).

 Muskellunge were selected more than any other species as a priority for validation, and were also ranked high in priority by 21 of 33 respondents (Question 12). Largemouth bass, smallmouth bass, and walleye were the next most selected species, with black basses ranking medium and walleye high in priority. Some species were mentioned by a small number of respondents, but were given a ranking of “high” (e.g., lake trout, northern pike, lake sturgeon, carp, shovelnose sturgeon, bloater chubs, blue sucker, flathead catfish, lake whitefish, and coregonids unspecified). Known-age marked or tagged fish exist according to 25 of 38 (66%) respondents (Question 13), but archived known-age structures were less prevalent (11 of 38, or 31%; Question 14). Most (83%) would be willing to contribute structures or images to a state-wide reference collection (Question 15). Many opportunities exist to increase the number of known-age fish, often with minimal financial investment (e.g., funding to purchase PIT tags and support for processing samples) and in association with routine field work (Questions 16 & 17). Most offices (89%) archive hard structures (Question 20). An inventory of archived structures is provided (Question 20).

Back-calculation is not commonly used (only 35% do back-calculations), and most offices (75%) lack equipment to back-calculate (Questions 18 & 21). Age data are used to assess growth, regulation decision making, assess recruitment, assess mortality, and for statistical catch-at-age modeling (Question 19). Suggested research and management questions and additional comments are provided (Questions 22 & 23).

The Fisheries Analysis Center (FAC) at UW-Stevens Point will be coordinating activities related to the development of educational materials and training modules, building reference collections, and creating a website to facilitate the exchange of information on current age estimation techniques, quality assurance practices, literature, as well as the development of a library of images of known-age fish. An age estimation workshop is planned for June 2011. The results of this survey will also be used to suggest prioritization of equipment purchases and upgrades in regional offices.

**Question 1. WDNR field offices represented in the survey results summary.**



**Question 2. Job titles represented:**



**Question 3. How frequently do fish population surveys in your area include an age component?**



**Question 4. When population surveys include an age estimation component, what hard structure is commonly used for each species (check all that apply, more than one structure may be selected per species)?**

*Species and structure most commonly selected:*



*Structure most commonly selected:*



**Question 5. If using scales, check the most common general method for processing and viewing**?



**Question 6. If using otoliths, what are the most common methods used for processing and viewing (check all that apply):**



*Specific breakdown for those who selected thin section and crack:*



**Question 7. If embedding otoliths in epoxy for thin sectioning, what brand of epoxy do you use?**



**Question 8. If using spines or fin rays, what are the most common methods used for preparation and viewing (check all that apply)?**



*Specific breakdown for those who described processing spines or fin rays (n=31):*



Additional comments:

|  |
| --- |
| "We follow the method described in: Koch and Quist 2007 A Technique for Preparing Fin Rays and Spines for Age and Growth Analysis. North American Journal of Fisheries Management 27:782–784, 2007." |
| "just started using a process for spines where the base is cut and viewed with fiber optic transmitted through structure." |

**Question 9. Do you assess precision of age estimates?**



**Question 10. If yes, how do you assess precision of age estimates (select most common)?**



**Question 11. Do readers have access to length or weight information when estimating age?**



**Question 12. Which species should be prioritized for age validation work?**

*Sorted by the number of total responses by species. Bold font indicates highest ranking within a species.*



**Question 13. Are there currently marked or tagged known-age fish in your area?**



*Marked or tagged known-age fish descriptions and locations (sorted by species).*



**Question 14. Do archived structures exist from known-age fish in your area?**



Specific Comments:



**Question 15. Would you be willing to contribute to a reference collection with hard structures, images, or both?**





|  |
| --- |
| **Question 16. Describe opportunities that may exist in your area for increasing the number of known-age fish (e.g., water bodies stocked and surveyed on a regular basis with a reasonable expectation of return of tagged or marked fish; known age 0 or age 1 wild fish in surveys)?**  |
| **Question 17. Describe the funding that would be needed for each opportunity listed above:** |



**Question 18-Do you back-calculate length at age?**





**Question 19. How do you use age data (check all that apply)?**

|  |  |
| --- | --- |
|  | Count |
| Assess growth | 36 |
| Assess mortality | 21 |
| Assess recruitment | 25 |
| Regulations decision making | 29 |
| SCAA | 3 |



**Question 20. Are hard structures archived in your field office?**





**Question 21. Do you have the capability of capturing digital images of hard structures or thin sections?**





**Question 22. Are there fish age estimation research or management questions that should be prioritized to answer, including both general and specific questions?**

**Question 23. Comments:**



Appendix 1. Original e-mail to WNDR biologists and technicians introducing the survey.

**From:** Bruch, Ronald M - DNR [Ronald.Bruch@Wisconsin.gov]

**Sent:** Wednesday, September 29, 2010 11:43 AM

**To:** DNR DL WD FH Fish Biol; DNR DL WD FH Fish TECH

**Cc:** DNR DL WD FH Fish SUPS; DNR DL WD FH Fish Brd; Isermann, Dan; Hansen, Michael; Nate, Nancy; Mitro, Matthew - DNR; Fayram, Andrew - DNR; Staggs, Mike D - DNR; Talbot, Mike J - DNR

**Subject:** Fisheries Analysis Center Fish Ageing Survey - Please respond by Oct 22

Fellow Fish Ageing Biologists and Technicians,

You may or may not have heard that our FM Board and Bureau established a Fisheries Analysis Center (FAC) at UW Stevens Point last year.  The Co-Directors of the center are Mike Hansen and Dan Isermann, and the Center Manager is Nancy Nate.  Andy Fayram, Matt Mitro, and I round out the group that are closely working with the center from our Department's Fisheries and Research programs to identify priority fish management issues and projects that the FAC and their graduate students can help us with.

One of the several areas of work that we will be focusing on is fish age estimation.  The FAC will not be a production fish ageing center.  Years of fish ageing experience and expertise reside in the field with you and all the other Biologists and Technicians that have been doing fish ageing for many years.  Our objectives at the FAC include helping move the science and practice of fish age estimation in Wisconsin to a level second to none, providing help with tough fish age estimation problems or species, helping to ensure field stations around the state get the best equipment possible for this job, setting up reference collections, and providing regular training opportunities for new and veteran fish agers.

We have been attacking fish ageing problems in our lab in Oshkosh for about 5 years now.  We have learned a lot in the process, but I am excited about the creation of the FAC so we can continue to move our program and the program around the state forward to an even higher level.

To get this program off the ground, we need your help.  We are asking all Biologists and Technicians who do any fish age estimation work to complete the survey at the link below.  We are attempting to gather base data on fish aging practices, species worked on, and equipment status within our agency from throughout the state.  Once we gather these data we will be able to better build a fish age estimation support program at the FAC that will meet your needs.  I would greatly appreciate if you will take the few minutes needed to complete the survey so we can get your information no later than October 22.

Link to the on-line survey:   <http://www.surveymonkey.com/s/CHP8GHD>

Again - I and all of us involved in the FAC appreciate your help.  We will be putting the survey results together and getting a summary back out to all of you this fall yet.  Also - we will be scheduling a statewide workshop on fish age estimation in 2011 to kick this new initiative into a higher gear and as a follow-up to the workshop we conducted in Oshkosh in 2006.

Let me know if you have any questions.

Ron

**Ronald M. Bruch, PhD**

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