

NPAFC
Doc. 944
Rev. _____

A Proposal to Simplify the Thermal Mark Code Notation

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Submitted to the

NORTH PACIFIC ANADROMOUS FISH COMMISSION

By

The United States Party

April 2006

This paper may be cited in the following manner:

Josephson, R., B.A. Agler, K.F. Van Kirk, and D.S. Oxman 2006. A proposal to simplify the thermal mark code notation. (NPAFC Doc. 944). 4p. Alaska Dept. Fish and Game, Juneau Alaska. 99801-5526

ABSTRACT

Thermal marks are characterized by groups of dark rings in one or more bands on the otolith. Marks are distinguished based on the numbers of rings and the spacing among the rings and bands. Current specifications allow both rings and bands to be spaced at three distances. Although that approach provides for a large number of combinations, many are difficult or impossible to distinguish. We are proposing to simplify the current specifications to improve our ability to distinguish among marks. We propose that only two types of spaces be allowed for rings and bands. Spaces between bands would be identified with a comma (,) or a dash (-). Ring spacing would be either narrow or normal. Other symbols for thermal mark codes are discussed.

INTRODUCTION

Munk and Geiger (1998) first introduced the RBr code and discussed the rationalization for its development and application. The Ad hoc Working Group on Salmon Marking (WGSM) adopted the RBr marking code in 1998 (NPAFC 1998). Hagen et al. (2000) proposed the use of a Hatch Code as an abbreviation of the RBr code and also as a code that was more representative of the actual mark.

Both papers recognize that there are two fundamental characteristics that make a mark unique: 1) the number of rings, and 2) the spacing between rings and bands. Rings can vary in the spacing between the rings, and groups of rings, called bands, can be placed at different distances relative to each other.

MARK SYMBOLOGY

We are proposing to simplify the current specifications adopted by the WGSM for mark symbology. The current specifications (Munk and Geiger 1998) permit three types of spaces between bands: 1) normal, 2) wide, and 3) extra-wide represented by comma (,), a hyphen (-), and a slash (/), respectively. Although these specifications dictate that the spaces between bands should be relative to the spaces observed in the rings that precede each band of a mark, a review of marks on the WGSM website suggests that creating marks with distinctly different spaces among bands is difficult. We found many marks with spacing that appears similar, but the marks have different Hatch Codes. We also found only 10 release records with the extra-wide spacing, designated by the slash (/). It is important to acknowledge that marks created by Japan are very accurate, even with extra-wide spacing; however, we feel that this level of precision would be difficult for many other hatcheries to achieve. We are also concerned that marks with subtle differences in spacing could be misidentified by some readers.

Another element of the mark code that we suggest be simplified is the spacing between rings. Any spacing among rings, either “narrow” or “wide,” is relative and must be viewed in relation to normally spaced rings. For example, the WGSN Website shows thermal marks that consist of a single band with narrow spacing among the rings (e.g. 5nH), but such a mark is not easily distinguished from a thermal mark consisting of 5 normally-spaced rings (i.e. 5H). We found numerous additional mark patterns in the database that also had the potential to be “difficult to differentiate” from one another, thus we suggest that there is a need to simplify the mark system.

Currently, narrow spacing between rings is indicated by the lowercase letter (n), and wider spacing is indicated by the lowercase letter (w). The “w” was introduced by Japan in 2003 (Kawana et al. 2003). The Japanese marks are very precise, and we do not question their use of wide ring spacing. However, we propose a slight change in the current mark specifications that would allow the first set of rings to be narrowly spaced. This would eliminate the need for the “w” while still allowing the same marks to be created.

Overall, we propose that we reduce the complexity of marks to make sure that unique and distinguishable patterns are applied to the otoliths in a successful and reliable manner. We recommend the following changes to the Hatch Code and the RBr code systems:

1) Only two types of spacing between bands would be allowed and would be identified with a comma (,) or a dash (-).

the Comma (,): represents a spacing of 2 to 2.5 times greater than the ring interval. The spacing would be relative to the preceding set of rings.

the Dash (-): represents a spacing of 3.5 to 5 times greater than the ring interval. The spacing would be relative to the preceding set of rings.

2) The slash ‘/’ would no longer be used in either the RBr or the Hatch Code.

3) The plus sign (+) would continue to represent the hatch event. Thus in the RBr code, bands listed after the plus sign occurred after the hatch event.

4) The lower case letter (n) is currently used in both Hatch and Rbr Codes to represent a narrowly spaced band of rings relative to the other band(s) in the mark. Narrow spacing is intended to be one half the normal ring spacing. We propose that narrow spacing would only be designated if normal spacing is present in the same mark and occurs on the same side of the hatch event.

5) A post-hatch band would not be labeled as narrow unless there is another band in the post-hatch region for comparison. As an example, the Hatch Code 3H4n would be incorrect because the second band of four rings is on the other side of the hatch mark, thus spacing is subjective. This mark would be labeled 3H4. It would, however, be

possible to create a 3H3,3n mark because the narrow spacing of the post-hatch 3n band could be compared to the regular spacing in the adjacent 3-ring band.

6) The lower case letter (w) to represent spacing between rings is not recommended.

7) The first band of a multiple band mark may be narrow as indicated by the lower case letter (n), such as a 2n,2H mark.

8) The RBr region designator of '3' was intended to be used when the otolith marks are located both in the pre- and post-hatch regions of the otolith. Such a mark would be very confusing, since there are no uses of this designator; it is recommended that the region designator of '3' is not permitted.

SUMMARY

We feel the suggested changes in this document would provide for a set of marks that are more consistent and more easily identified.

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