# NMT Network News

Northwest Marine Technology, Inc.

Pioneering solutions for the problems of aquatic resource management

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## *Detecting Coded Wire Tags with the Handheld Wand Detector..... ....An Alternate Technique*

*by Geraldine Vander Haegen and Lee Blankenship WDFW*

### Introduction

Using the standard technique suggested by Northwest Marine Technology (NMT), previous tests of the hand-held wand detector showed that it can reliably detect over 90% of tags in adult chinook salmon (Blankenship et al. 1999; Olson et al. 1999). However, those studies also suggested a bias toward lower detection rates in larger fish, particularly when the wand was used improperly. The failure to detect a tag probably results from the depth of the embedded tag surpassing the range of the wand. While working within the present range limits of the wand, we hypothesized that sampling inside the mouth of the fish with the wand would improve its ability to detect tags because the distance between a deeply embedded tag and the wand would be shorter. Here, we report on some initial tests of this method and our recommendations for its use and further study.

### Methods

Chinook - Soos Creek Hatchery

Coded-wire tagged chinook returning to Soos Creek Hatchery in 1999 were recognizable by the absence of the adipose fin. These fish were visually separated from unmarked fish by the hatchery crew during normal spawning and sorting activities. Knowing these fish were likely to have CWTs, we attempted to electronically detect the tags using the standard wanding technique described by NMT (wanding only outside the snout). If no tag was detected, we then tried detecting the tag by sampling inside the mouth. In this method, the fish is held by the gills so that the mouth gapes open. The wand is inserted vertically into the fish's mouth with the long axis of the wand parallel to the spine. The most sensitive side of the wand (the side with the arrows) is placed against the roof of the mouth and moved up and down several times over the entire surface of the roof of the mouth. The fish were thus sorted into three groups: fish with tags that could be detected using the standard technique only, fish with tags which could only be detected by sampling in the mouth, and fish with undetectable tags. The fork length of each fish was measured, and all snouts were collected along with an indication of which wanding method was used.

Coho - Solduc Hatchery

Coho returning to Solduc Hatchery in 1999 could not be distinguished by visual means; all of the hatchery fish in this brood year were fin clipped. As the fish were removed from the adult pond for spawning, the hatchery crew used the standard wanding technique to detect tags. All tagged fish were set aside, then the fish in which no tag was detected were re-sampled by wanding in the mouth.

### Results

We sampled 304 marked chinook for CWTs at Soos Creek Hatchery. Tagged fish ranged from 46 cm to 107 cm (FL), with either 1.1 mm or 1.5 mm CWTs. CWTs were detected in 272 fish using the normal wanding technique. All 1.5 mm CWTs were detected using the normal wanding technique. Using the normal wanding technique, we missed 21 CWTs (7.2%), all of which were detected by wanding in the mouth, and all of which were 1.1 mm CWTs. Fish with tags that were detected only by wanding in the mouth did not show a particular bias towards larger fish, rather they spanned the range of lengths seen. Eleven marked fish in which no tag could be detected by either method were later shown by dissection to have no tag; we did not miss any CWTs using the (cont.)

### *Wand Technique cont....*

combined methods.

Some fish with CWTs detected using the standard method were also wanded in the mouth. In every case, we could still detect the CWT. If the signal was weak with the standard wanding procedure, wanding in the mouth produced a strong signal. The number and lengths of these fish were not recorded, and will be the subject of future studies.

At Solduc Hatchery, we resampled 400 coho salmon by wanding in the mouth, but did not recover any more tags. All CWTs recovered were 1.5mm

## Discussion

We demonstrated that 7% more tags could be detected by sampling chinook in the mouth. We had expected that sampling in the mouth would improve detection only in the larger chinook, but our results showed otherwise. Because trained samplers were used, and because those samplers already had the expectation of finding a tag, we can not attribute the missed tags in the smaller fish to poor wanding technique, rather, more effort than usual was used to find the tags by the standard method. All of the missed tags were 1.1 mm tags, and in several cases, a 1.5 mm tag in a fish of the same length was detected with the standard wanding tecnique. No 1.5 mm tags were missed in coho using the standard technique. This result is expected given that coho are generally smaller than chinook.

Based on these results, we are not proposing to change the wanding technique for coho, but feel that further examination on fish returning with 1.1 mm tags is necessary. We support the continued use of 1.5 mm tags given that coho are usually tagged at a reasonably large size, that the survival is not reduced compared to 1.1 mm tags (Vander Haegan & Blankenship 1999) and that the wands can reliably detect 1.5 mm tags even in large coho.

In this and previous studies, we have shown the wand can detect more than 99% of 1.5 mm tags in chinook, and therefore continue to support the use of 1.5 mm tags. However, the present study suggests the rate of detection of 1.1 mm tags can be as high if chinook in which no tag was detected using the standard wanding method are then wanded in the mouth. This is a compelling reason to consider requiring samplers to wand chinook in the mouth if they have not detected a tag by the standard wanding method, or if beeps indicate a tag is present. Ideally, we would like to require only a single sampling method to increase the speed with which fish could be sampled for CWTs. Some cursory examinations suggest that we may be able to detect all tags by sampling only in the mouth, but we will not adopt this method until further studies are completed in the fall of 2000. A second advantage of wanding in the mouth is that it may decrease the number of false positive detections that result from dirt on the skin of the fish. The inside of the mouth is generally clear of debris.

In conclusion, we presently recommend wanding chinook in the mouth if no tag was detected using the standard wanding method. In the fall of 2000, we will conduct further studies to determine if this should be the only technique used for chinook and coho.

## References:

Olson, R., K. Phillipson, and D. Zajac. 1999 Detection of coded wire tags in chinook salmon with the "wand" detector. Pp. 54-58 in Selective Fishery Evaluation Committee, 1998 Annual Report. Pacific Salmon Commission SFEC (99)-1.

Blankenship, H.L., D. Thompson, and G. Vander Haegen. 1999. Returns of chinook salmon coded wire tagged with 1.1 mm and 1.5 mm coded wire tags and adult electronic detection. Pp 59-63 in Selective Fishery Evaluation Committee, 1998 Annual Report. Pacific Salmon Commission SFEC (99)-1.

***Workers at George Adam's Hatchery demonstrate the "Alternate Technique" of CWT detection on an adult Chinook using the Handheld Wand Detector***

## VI Alpha Tags Used in Wyoming Trout Study

**Amy Schrank**

The University of Wyoming and The Wyoming Game and Fish have been working cooperatively to study Bonneville cutthroat trout (BRC). The study uses NMT's soft VI alpha tag, introduced by Northwest Marine Technology in 1997. VI alpha tags are placed in clear or translucent tissue, such as the postocular adipose eyelid and can be used for individual identification by a visible alphanumeric code on the tag.

The Wyoming researchers are using VI alpha tags to help determine the movement patterns of individual BRC in the Thomas Fork drainage, Wyoming. The researchers have implanted VI tags in 1,437 BRC over the course of 2 years at various sites throughout the drainage. Adipose fins are clipped from all tagged fish to determine tag retention.

Tags are inserted in the adipose tissue behind the eye. Fish are anesthetized prior to tagging to help ensure successful insertion and minimize stress. Fish under 160 mm are not tagged due to lack of sufficient adipose tissue behind the eye to reliably hold the tag. Practice increases the success of the insertion and the speed of the process. Additionally, cleaning the injector regularly, as well as keeping both tags and injectors wet during use, increases ease of loading and inserting tags.

To date, 165 fish have been recaptured (11.5%). Of these recaptures, 147 fish (89%) had retained their tags. By re-sampling tagging sites and other locations, BRC movement information is gathered. Electrofishing has been used to recover a majority of these fish. Signs have been posted throughout the drainage area that direct anglers capturing fish with VI tags to notify the Wyoming Game and Fish Department of fish location, size and VI tag number.

VI tags have been particularly useful in determining movement before and after spawning. Implanting VI tags in fish at sites throughout the drainage during different seasons, this study has determined that spawning movements of over twenty kilometers take place in the Thomas Fork drainage. A group of fish in the mainstem Thomas Fork were tagged in early fall and subsequently recaptured the following spring on the spawning grounds. Likewise, fish have been captured in the mainstem that were originally tagged in the tributaries during spawning.

In addition to spawning movements, VI tags have been useful in determining whether or not the diversion dams and culverts present in this drainage represent barriers to BRC movements. Fish that were VI tagged below both culverts and diversion dams have been recovered upstream of the potential barriers, indicating that some fish can negotiate these obstacles.

Through use of NMT's VI alpha tag the researchers from the University of Wyoming together with the Wyoming Game and Fish have had positive results in their study of the BCR. An understanding of the behavioral and spawning migration traits of BRC will be useful in developing the Thomas Fork drainage area's management program.

## *Where In The World.....*

***In September...****NMT* CEO Guy Thornburgh and European Representative, Dr. David Solomon traveled through Norway.
The purpose of this visit was to explore the application of a Mass Marking system to the Salmon industry in that country.
They also visited many of NMT's current Norwegian tag users.

***Destination....Bejing, China!***
Director of Marketing, Stan Moberly, will travel with Asian Representatve, Mr. Yong Huang, to the World Fisheries Congress in Bejing October 31-Nov. 3rd.
On the way, they will stop in Seoul, Korea to demonstrate the MKIV Automatic Tag Injector.

***Fisheries Biologists Association...***
Meets October 23rd, 2000 in Ocean Shores, Washington.
NMT Biologist, Dan Yule, will speak on his work using sonar to count trout in lakes.

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# NMT Welcomes Dan Yule

***Dan Yule was born and raised in Fall Creek, Wisconsin. In 1989, he received a BS in Biology with a minor in computer science from the University of Wisconsin at River Falls. He completed a MS in Biology at Utah State University, under the direction of Dr. Chris Luecke, where he studied lake trout and kokanee salmon interactions in Flaming Gorge Reservoir, Wyoming-Utah. Between 1991 and 1997, Dan oversaw the North Platte River Fisheries Study, the largest trout stocking evaluation ever conducted in the Rockies. Study results that improved angling opportunity were recently published in the "North America Journal of Fisheries Management "(20:10-18).***

On starting his new job Dan wrote: "As a fisheries researcher, I've seen the utility of NMT tagging equipment. Prior to the North Platte Study in Wyoming there was a shortage of hatchery resources and some management requests for stocked trout were not being realized. This problem resulted from the need to stock large numbers of catchable size trout in the North Platte reservoirs to reduce losses to piscivorous walleye. From coded wire tags we learned that stocking trout during fall improved survival. When stocking requests for the North Platte reservoirs were moved to fall, hatchery space for stocking trout elsewhere in Wyoming became available. Standardized gill netting suggests that trout numbers in the reservoirs have doubled at no additional costs. For the first time in 20 years, all statewide trout stocking requests were met! I see my new job at NMT as an opportunity to help scientists around the globe improve management of fisheries resources. I'm excited to be on their team."

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