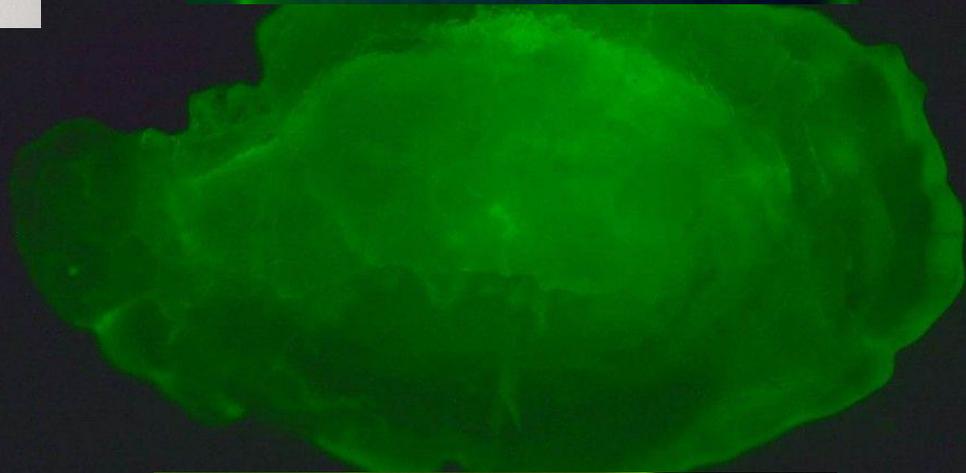
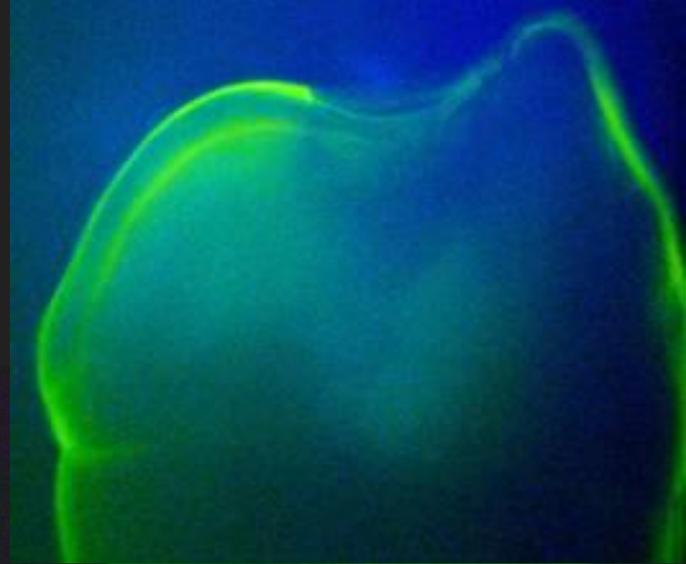


Use of Fluorescent Grit Marking as a Means of Mass Marking Salmonids

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High Pressure Application of Fluorescent Grit

First reported use in late-1950's. Heavy testing with salmonids in the 1970's.

Advantages:

- 1) Fast : ~30,000 RBT (100/lb) an hour.
- 2) Cheap: ~100 lbs of StS fry/lb of grit @ \$30/lb
- 3) Demonstrated high marking efficiency and low marking mortality if proper application pressure and techniques are used.
- 4) Mark retention : short term (1 year)-extremely high and long term (>1 year) – good.

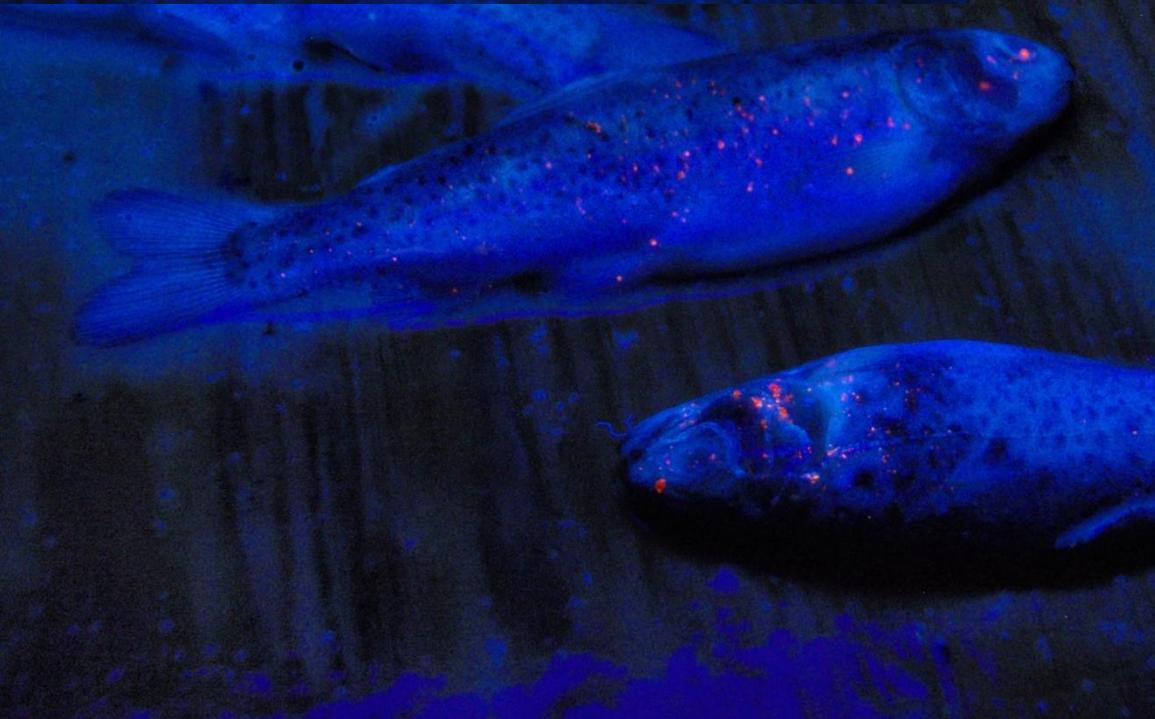
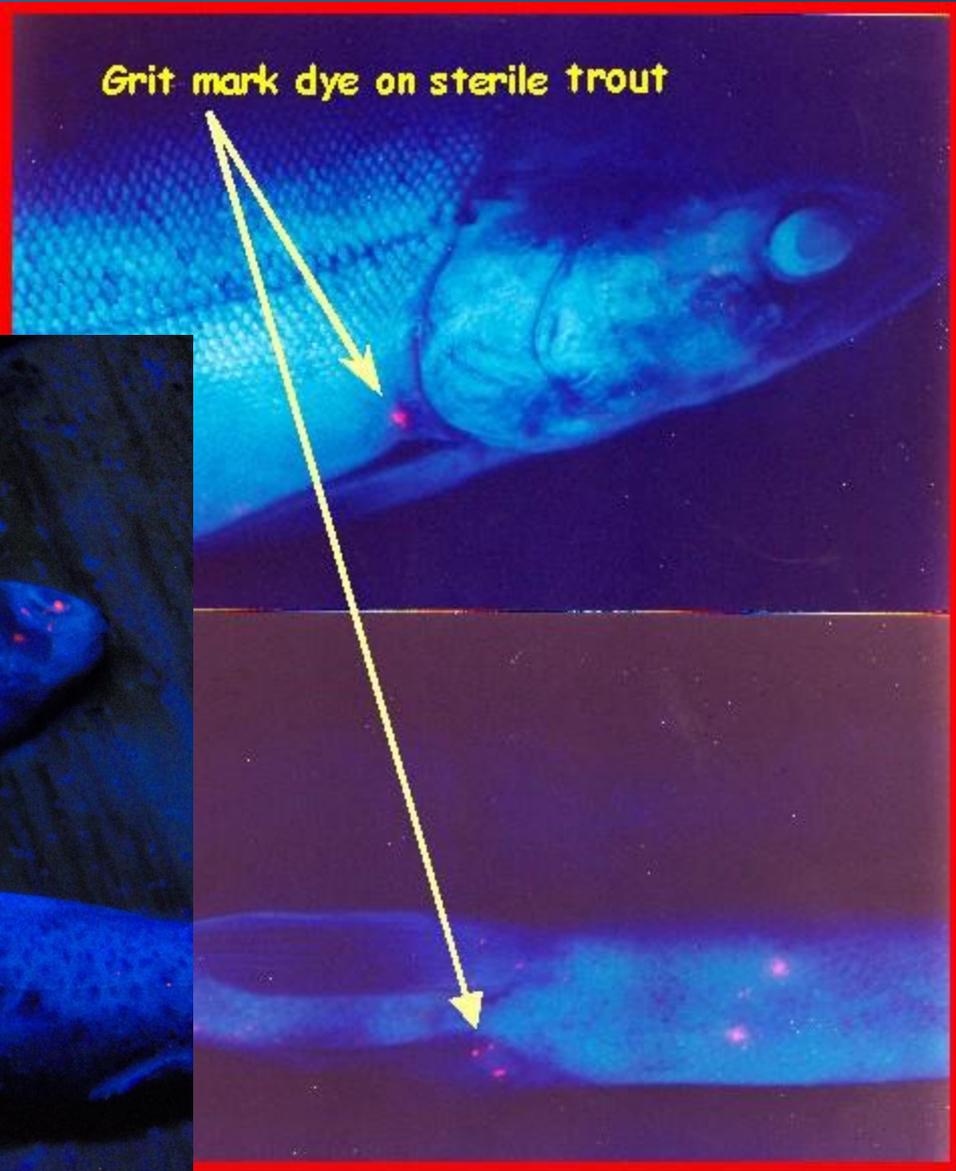
Disadvantages:

- 1) Identification of mark requires black light and thus is time-consuming.
- 2) Mark identification on live fish is difficult unless anesthetized.
- 3) No individual marks.







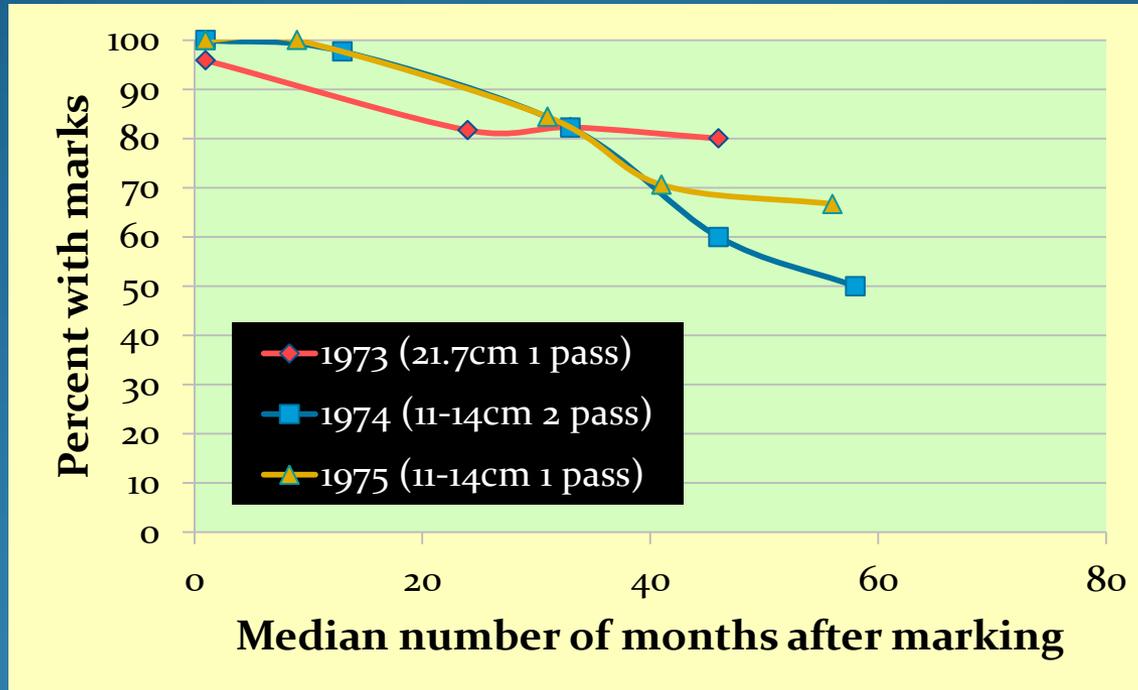


Plan was to differentially mark all StS fry scheduled for Spring 2015 release into the Crooked and Deschutes basins.

This will allow us to look at:

- 1) Tributary source of StS smolts entering the FTF in 2016,
- 2) Level of residualism occurring in tributaries – Whychus, Ochoco, and McKay Creeks.
- 3) Potentially, tributary source of returning adults.

Fluorescent pigment retention rates for 1973-1975 broods of summer steelhead after varying periods at large



Michael D. Evenson & R. D. Ewing (1985): Long-Term Retention of Fluorescent Pigment Marks by Spring Chinook Salmon and Summer Steelhead, *North American Journal of Fisheries Management*, 5:1, 26-32

Chinook fingerlings marked at ~400/lb

Table 1. Numbers of spray-marked and control chinook salmon in spawning migrations from 1986 through 1989. F = female, M = male, ? = sex unknown.

Year	Spray-marked	Control
1986 (age 2)	1 F	1 F, 1 ?
1987 (age 3)	0 F, 6 M	4 F, 5 M
1988 (age 4)	8 F, 3 M	17 F, 6 M
1989 (age 5)	0	2 F

Negus, M.T., D.A. Belford, and S.E. Colvin. 1990. Long-term retention of fluorescent pigment marking of chinook salmon. Minnesota Department of Natural Resources Fisheries Investigational Report #402.

Summer Steelhead Fry (217/lb) marked at various application pressures

Application Pressure (psi)	Average % initial mortality	Average marking efficiency (%)		
		14 days post	44 days post	146 days post
120	3.7	96	90	90
100	3.2	93	90	89
80	1.9	89	90	89

Air-stocked RBT (600/lb) marked at 105 P.S.I.

Date	Days after marking	Percentage marked
07/03/13		
08/06/13	34	92.7
08/27/13	55	91.7
06/24/14	356	90.7
11/13/15	863	68.9

Initial marking mortality estimated at ~10%

Our first attempts to mark summer steelhead fry compared to an early attempt to mark sockeye fry

Date marked	Average size (#/lb)	Application pressure (psi)	Marking mortality (%)	Initial marking efficiency (%)	Marking efficiency (%)	Examined X days after marking
May 14, 2015	1489	120	47		70.8	64
May 28, 2015	714	100	13		45.2	49
June 1967*	1680	80	8	75.2	55.9	56

* Narver, D.W. and B.C. Andersen. 1969. Initial field tests of mass-marking recently emerged sockeye fry with fluorescent pigment. Manuscript Report Series No. 1062, Fisheries Research Board of Canada.

In 2015 we differentially marked StS fry scheduled for Spring 2015 release into the Crooked and Deschutes basins.

2) Level of residualism occurring in tributaries – Whychus, Ochoco, and McKay Creeks.

Tributary	# of stations	# of fry examined	# of marked fry found	Expanded # of marked fry	% of fry from 2015 stocking
Wychus Creek	4	267	25	55	20.6
Ochoco Creek	3	372	17	24	6.5
McKay Creek	2	247	10	14	5.7

Summary

- High pressure application of fluorescent grit has the advantages of being a fast, easy, and inexpensive way to mark large numbers of fish.
- Disadvantages are the inability to individually mark fish and that fish need to be immobile to be examined under black light.
- Marking mortality, efficiency, and retention (short-term and long-term) can vary with marking pressure, size, and species of fish.

Summary

- Proven effective (high marking efficiency and low marking mortality) as means to mark salmonids as small as 250/lb.
- Mark retention on fingerling and larger salmonids excellent for one year and some retention up to 8 or more years.
- Promising results with salmonid fry (<500/lb).

Questions?

