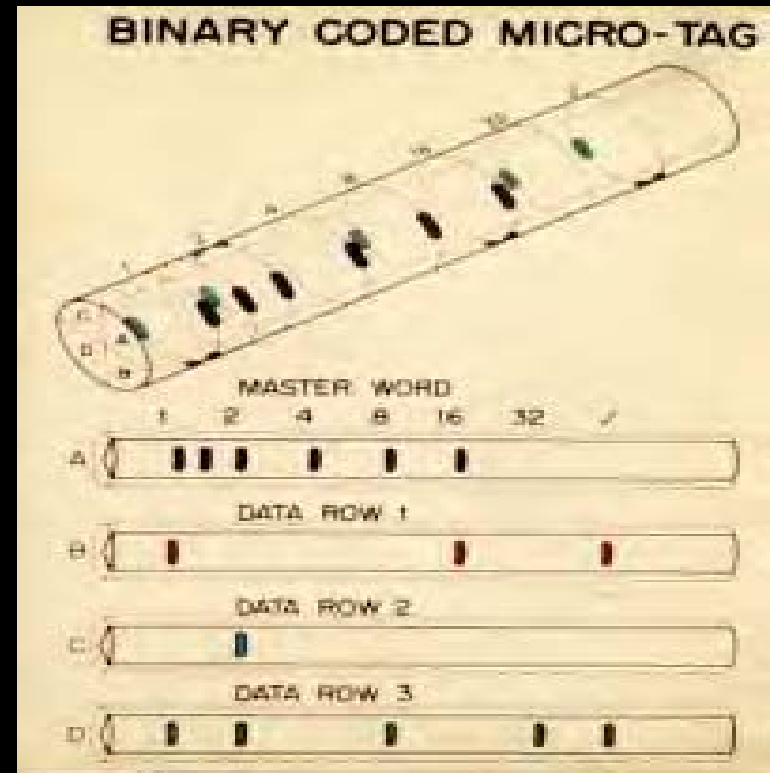


CWT Workgroup Report



April 9, 2008

Marianna Alexandersdottir

CWT Workgroup Report

- Background
 - Importance of CWTs to Pacific Salmon Commission
 - Expert Panel Report
- What is the CWT Workgroup and report?
- How we approached our task.
- What were our recommendations?

Pacific Salmon Treaty Memorandum of Understanding

“The Parties agree to maintain a coded-wire tagging and recapture program designed to provide statistically reliable data for stock assessments and fishery evaluations.”

CWT Program provides vital data

- Only historic record of *age and stock-specific* impacts over time, since 1970's
- Fully integrated tagging, sampling and recovery programs coast wide
- Centralized database with standardized reporting protocol
- Cohort analysis provides estimates of exploitation rates and survival
- Evaluation of fishery impacts
- Fundamental management tool

Coastwide assessments

- Ability to assess and manage harvest of coho and Chinook salmon in multi-stock fisheries coast wide from Alaska to California

Coastwide assessments

- Chinook - Harvested as mature and immature fish over several years; PSC Indicator Stock Program
- Coho - Predominantly harvested as maturing fish during second year of marine residence; Regional tag groups

Fishery, stock and age specific ER

$$\text{ER (Age 3)} = \frac{\text{Catch(Age 3)}}{\text{Cohort(Age 3)}} = \frac{400}{4,439} = 9.0\%$$

Fishery, stock and age specific ER

- Conservation Goals
 - Annual management objectives
 - Basis of PST Chinook and coho implementation
- Socio-Economic Goals
 - Allocation of allowable impacts
 - Fishery shaping

Emerging problems with CWT program

- Quality of estimates of ER depends on:
 - Number of CWTs recovered
 - Quality of estimates of total catch and escapement
 - Data quality control

Emerging problems with CWT program

- Decrease in survival
- Decrease in fishery harvest
- Redistribution of CWTs to fisheries where CWT recoveries and accurate estimates of total catch are more difficult to obtain
- Increase in escapement including strays to natural spawning grounds
- Complications from mass marking and mark-selective fishing

Emerging problems with CWT program

- ⇒ Decrease in number of CWTs recovered
- ⇒ Increase in statistical uncertainty
- ⇒ Increase in management risk

PSC concerns

- 2004 - PSC convened an eight member **Expert Panel** of scientists to examine the CWT program, consider new and emerging technologies, and provide recommendations to the PSC
- 2006 – Expert Panel Report (Hankin et.al. 2005) published (19 Findings, 14 Recommendations)
- 2006 – PSC appointed the CWT work group

CWT work group

- Marianna Alexandersdottir (NWIFC, Chair)
- Ethan Clemons (ODFW)
- Carrie Cook-Tabor (USFWS)
- Allen Grover (CDFG)
- Annette Hoffmann (WDFW)
- Ron Josephson (ADFG)
- Scott McPherson (ADFG)
- Mike Matylewich (CRITFC)
- Gary Morishima (QIN)
- George Nandor (PSMFC)
- Chuck Parken (CDFO)
- Patrick Pattillo (WDFW)
- Brian Riddell (CDFO)
- Norma Jean Sands (NMFS)

Expert Panel Report

- ***Expert Panel Report - Finding 1.***

The CWT system is the only technology that is currently capable of providing the data required by the PSC.....

Expert Panel Report

- ***Recommendations 1-3***

Remedial measures should be undertaken immediately to correct deficiencies in data collection and reporting throughout the basic CWT system and to improve analysis of CWT recovery data

- ***GSI Steering Committee - Recommendation 1.***
The PSC should recommend that agencies undertake measures to restore the structural integrity of the CWT system and improve its performance.....

Organization of CWT Workgroup Report (PSC Tech. Rep. 25, March 2008)

- Four primary chapters plus extensive appendices to support summary tables and recommendations.
 - Chapters 1-3 Introduction & Context
 - **Chapter 4, Current Status of the CWT Program**
 - **Chapter 5, Criteria for Precision and Accuracy.**
 - **Chapter 6, Decision Theoretic Model**
 - **Chapter 7, Conclusions and Recommendations**
 - **Appendix containing Agency-specific recommendations for addressing issues**

Review and Recommendations

- General Status Review and Recommendations
- Regional Review and Recommendations

Components of Uncertainty in Estimates of ERs

- Precision (random sampling error)
 - Tags Recovered
 - Number of fished tagged,
 - Sample rates for fisheries and escapements.
 - Precision of estimates of total harvest or escapement used to calculate sample expansion.

Components of Uncertainty in Estimates of ERs

- Bias (non-random error)
 - Sample coverage for fisheries and escapements,
 - Non-representative sampling, and
 - Bias in catch or escapement estimates.

Current coast wide “standards” for CWTs

- Chinook Indicator tag groups release 200,000 fish per brood
 - Currently no formal coho indicator program.
- All fisheries encountering CWT'd fish sampled at 20%
- All escapement with CWT'd fish present sampled
- A minimum of 10 observed tagged fish per stratum

Chinook Indicator Stock Summary

STOCK INFORMATION		REGIONAL MARINE FISHERIES																										
Region	Stock	Key Issues					Fishery Specific Key Issues																					
		Release	Escapement (Hatchery)	Escapement (Sp Group)	Term Com	Term Native	Term Sport	SEAK TR	SEAK Sport	SEAK Net	NCBC Troll	NCBC Sport	NCBC Net	WCVI Troll	WCVI Sport	Geo Strait Troll	Geo Strait Sport	SBC Net	WAOcn Troll	WA Ocn Sport	PS Sport	WA Net	Col Riv Sport	Col Riv Net	OR Coast Troll	OR Coastal Sport	CA Troll	CA Sport
Alaska	Alaska Central Inside	1	1	1				1	2																			
	Little Port Walter	1	1	1				1																				
	Alaska Southern Inside	1	1	1	1			1	2																			
Canada	Big Qualicum	1	1		3	3	3	2			3						3											
	Chilliwack (Harrison Fall Stock)	2		2		3								1	3		2		1									
	Cowichan	1	1			3	3							2	3								2					
	Kitsumkalum	1				3	3	1				3	3															
	Puntledge	2	1		3	3	3	2				3					3											
	Quinsam	1	1	1	3	3	3	1				3																
	Robertson Creek	2	1	1	1	2	3	1				3																
	Snootli	3			3	3	3	2			2	3	2															
Washington	George Adams Fall Fingerling	1	1	3	2		3							1	3					1		1	2					
	Green River Fall Fingerling	1	1	2	1									1	3		3		2		1	1						
	Grovers Creek Fall Fingerling	1	1											1	3				1		1	1						
	Hoko Fall Fingerling	3	1	2				1			2																	
	Nisqually Fall Fingerling	1	1		1		3							1								1						
	Nooksack Spring Yearling	1	1											2			3											
	Nooksack Spring Fingerling	2	1	2				2						1	3		3											
	Queets Fall Fingerling	2		3	1			1			1	3																
	Samish Fall Fingerling	1	1				3							1	3		3		2		2	1						
	Skagit Spring Fingerling	1	1											1	3						2							
	Skagit Spring Yearling	2	1											1	3						1							
	Sooes Fall Fingerling	2	1		2			2			2	3																
	South Puget Sound Fall Yearling	1	2		2										3						2	2						
	Squaxin Pens Fall Yearling	3			2									2								1	2					
	Skagit Summer Fingerling	3						1				3			2	3		3			2							
	Stillaguamish Fall Fingerling	3	1	2										2	3		3				2							
White River Hatchery Fingerling	1	1	3																	2								
White River Hatchery Yearling	1	1																			2							
White River Fall Fingerling	3	1											2								2							
White River Spring Yearling	3	1																			2							
Oregon	Salmon River	2		1			2	1			1																	
Columbia River	Cowlitz Tule	1	1	3				2						2	3					2	2				2	2		
	Hanford Wild	1		2				1			2														1			
	Columbia Lower River Hatchery	1	1											1	3					1	2				1	1		
	Lewis River Wild	3						2			2			2	3					2					2	2		
	Lyons Ferry	3												2						1	1				1	2		
	Spring Creek Tule	1	1											1	3					1	1				1	1		
	Columbia Summers	1	1					1			1	3			3					1					1			
	Upriver Bright	1	1					1			2														1			
Willamette Spring	1	1				2	1																	1				
California	Sacramento falls	1	1	3			3																		1		1	2
	Sacramento winters	3	1	1			3																					3
	Central Valley Spring	1	1	3			3																		1		1	2
	Klamath-Trinity falls	1	1	1		1																						1
	California coast	3	3	3																								2

6/25/2008

Results of status review

- Corrective actions can be taken at reasonable cost so that agreed objectives can be met to maintain the viability of the CWT program.
- This does require some increased investment in the CWT system.

Results of status review

- CWT program must be dynamic, capable of responding to changes in fisheries and environment
- All components of the CWT program require attention; tagging, sampling and database reporting and maintenance
 - ➔ Planning tool

Recommendations - Coverage

The workgroup identified gaps in geographic and stock-type tag representation (Section 7.1 and 7.3) which should be addressed by the PSC and agencies.

- Coho coverage. There is no formal coho coast-wide indicator stock program, but all tagged releases are used where appropriate. (See Table D-1).

Recommendations – QA/QC

Quality control for reporting and validation of CWT data needs to be improved

- A workgroup including members of the CoTC, CTC, Data Sharing, and SFEC should be established to provide recommendations to strengthen the current validation process (Sections 7.2 and 7.4).

Regional Reviews

- Regional representatives reviewed programs within their agencies, identified issues, and proposed solutions.
- Assigned priorities and, where possible, estimated costs

Recommendations - Regional Reviews

- Agencies will need to identify specific actions that most effectively and efficiently improve the CWT system (see Appendix A).
- Each agency should review its CWT tagging and sampling programs and provide the PSC with a written plan to address Workgroup recommendations by October 1, 2008

Regional Review (example)

ISSUE 10 (Bias): Incomplete Coverage of Fisheries or Escapement Areas

Problem	Consequences	Solution
All fishery or escapement locations where tagged fish are present are not sampled.	Estimates of tagged fish are missing for unsampled fishery or escapement strata. Therefore, estimates of cohort size and ERs are biased, generally overestimated or zero. This could result in over fishing or in unnecessary fishery closures.	All locations where tagged fish for indicator or regional stock groups are present should be reviewed for importance to estimation of total cohort size. If presence of tagged fish is substantial these locations should be sampled.

Regional Reviews (example)

ISSUE 10 (Bias): Incomplete Coverage of Fisheries or Escapement Areas

	Chinook		Coho	
Region	Priority	Reason for priority	Priority	Reason for priority
British Columbia	Low to Medium	Unsampled commercial fisheries are small and past sampling indicated few, if any, indicator stock CWTs. Some sport and Native fisheries are unsampled.	Low to Medium	Same comment as Chinook.
Columbia River	High	Increase sampling of summer sport fisheries in the Columbia River given appropriate funding.	Low	Escapement sampling is currently occurring to meet management objectives at ESU levels. Additional funding would be needed to implement directed fishery sampling programs beyond those that are currently prosecuted
	High	Modify sampling in lower Columbia River to allow for recoveries of DIT fish		
	High	Equip samplers with appropriate gear to collect tags in escapement.		