

APR Part 3

- Review Logic Path for the Adaptive Management Process
- Review Key Assumptions
- Sensitivity Analysis

Components of Adaptive Management

- I. Annual Program Review
 - a. Program Goals (harvest and conservation)
 - b. Key Assumptions
 - c. Management Policy

Purpose: Confirm/adjust Key Assumptions and Management Policy to ensure that Program Goals are met over time

- II. In-Season Management

Components of Adaptive Management



Program Goals

- **Conservation or Natural Production Goals:**

- 7,500 total spawners—5,250 natural origin spawners (NOS)
- Increase temporal and spatial diversity of spawning/rearing
- Increase fitness by increasing the relative influence of the natural environment through low pHOS (<0.30) and high PNI (>0.67)

- **Harvest Goals:**

- Increase harvest for all fishers
- Harvest full tribal allocation
- Increase % of individual tribal member harvest

Key Assumptions

ENTER KEY ASSUMPTIONS		2010 data	2011 data	2012 data	2013 data	2014 data	2015 data	Recent 5-year Running Average	Current Conditions
	HABITAT PARAMETERS								
Habitat	Habitat Productivity	7.5	7.5	7.5	7.5	8.9	8.9	5.8	5.8
Hydro	Habitat Capacity	12,499	12,499	12,499	12,499	7,442	7,442	16,296	16,296
	MIGRATION PARAMETERS (SAR)								
	Juvenile Outmigration							-	27.00%
	Ocean Survival (BON to BON)							-	1.98%
	Adult Migration							-	83.00%
	SAR (absent harvest; adult-equiv. SAR)							0.44%	0.44%
	HARVEST RATES-NORS								
Harvest	Ocean (unmarked)		26.8%	34.7%				30.5%	30.5%
	Lower Col. Zones 1-5 (unmarked)	13.1%	8.5%	5.8%	6.6%	7.8%		8.0%	8.0%
	Upper Col. Bonneville to Wells (unmarked)	34.6%	18.7%	23.0%	28.8%	36.9%		27.5%	27.5%
	NOR Terminal Induced Mortality Rate	4.0%	12.6%	3.8%	4.4%	10.2%		6.1%	6.1%
Harvest	HARVEST RATES-HORS								
	Ocean (marked)		26.8%	34.7%				30.5%	30.5%
	Lower Col. Zones 1-5 (marked)	13.1%	8.5%	5.8%	6.6%	7.8%		8.0%	8.0%
	Upper Col. Bonneville to Wells (marked)	34.6%	18.7%	23.0%	28.8%	36.9%		27.5%	27.5%
	Terminal Above Wells - Integrated	13.9%	21.4%	46.6%	41.5%	36.1%		29.1%	29.1%
	Terminal above Wells - Segregated							-	90.0%
	HATCHERY (release year)								
Hatchery	In-Hatchery Pre-spawning survival	98.8%	93.6%	98.0%	95.0%	83.8%		92.6%	90.0%
	Percent Females in Hatchery Brood	50.0%	53.0%	51.0%	53.0%	48.4%		51.4%	51.4%
	Eggs/Female	4,787	5,115	5,116	4,578	4,558		4,842	4,600
	Egg to smolt survival-yearlings	78.0%	77.1%	85.0%	92.0%	88.5%		85.6%	85.6%
	SAR-yearlings	1.9%	0.6%	2.3%	0.8%	2.7%		1.7%	1.7%
	Egg to smolt survival-subyearlings	N/A	N/A	N/A	N/A	91.7%		91.7%	87.0%
	SAR-subyearlings	N/A	N/A	N/A	N/A			-	0.3%
	Stray Rate to Okanogan—from Segr Prog							-	20.0%
	Stray Rate from Integr. Prog (to other basins)	3.52%	1.28%	2.05%	0.73%			1.35%	1.35%
	% Integrated HORS spawning in the Okanogan							-	50.0%
	% Returning to Hatchery (HOB + Surplus HORS)				40.30%	60.65%	70.44%	57.13%	50.0%
	Relative Reproductive Success of HORS							-	80.0%
	Weir Efficiency					16.90%		16.90%	16.90%

Management Policy

- The Management Policy includes: number of releases (yearlings, subyearlings), pNOB, weir removal rate, harvest rates, etc.
- Review Key Assumptions and Management Policy each year to ensure that program goals are met over time.

Sensitivity Analysis can shed light on the following questions:

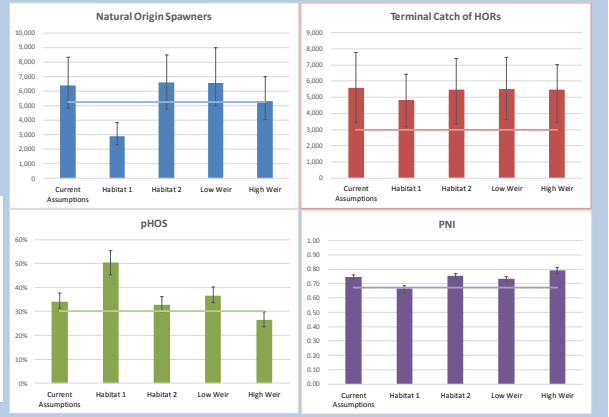
- Which Key Assumptions are a) uncertain, and b) affect Management Policy and predicted outcomes?
- Which Key Assumptions increase the likelihood of meeting program goals?
- What are the critical Key Assumptions that place goals at risk?

ISIT Sensitivity Analysis

	Current Assumptions	Habitat 1	Habitat 2	Low Weir	High Weir
Productivity	5.8	8.9	7.8	5.8	5.8
Capacity	16,296	7,412	16,332	16,296	16,296
Weir Efficiency	16.9%	16.9%	16.9%	5.0%	50.0%
Bonneville to Wells Dam Harvest Rate (NORs)	27.5%	27.5%	27.5%	27.5%	27.5%
Bonneville to Wells Dam Harvest Rate (HORs)	27.5%	27.5%	27.5%	27.5%	27.5%
Terminal Harvest Rate (NORs)	6.1%	6.1%	6.1%	6.1%	6.1%
Terminal Harvest Rate (HORs)	29.1%	29.1%	29.1%	29.1%	29.1%

CONSERVATION AND HARVEST GOALS (based on 5-year running averages)

Program Targets	Projected Status in 2016-2040					
	Current Assumptions	Habitat 1	Habitat 2	Low Weir	High Weir	
NOS	5,250	6,379	2,887	6,606	6,560	5,307
pHOS	30%	34%	50%	33%	36%	26%
PNI	0.67	0.75	0.66	0.75	0.73	0.79
Terminal Catch of HORs	3,000	5,597	4,836	5,466	5,516	5,465

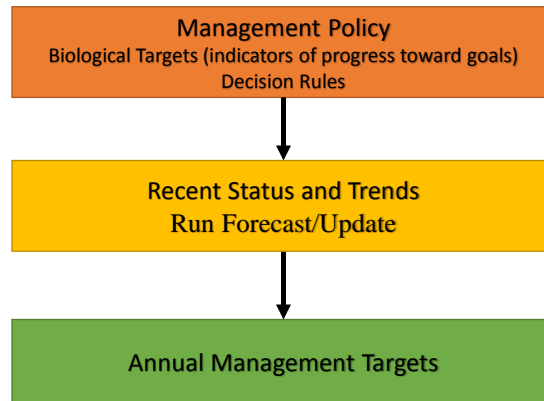


Components of Adaptive Management

- I. Annual Program Review
- II. In-Season Management Decision Making

II. In-Season Management Decisions

What is the “right thing to do” the coming season to meet Biological Objectives



Biological Targets are indicators of annual progress toward meeting program goals.

- Total pHOS (all programs) < 30%
- Segregated program pHOS <5%
- PNI > 0.67
- Minimum NOS target of 800 to collect brood for the integrated program
- pNOB between 30% and 100%
- Smolt release targets

Management Targets

Based on 2016
preseason forecast of 10,000
NORs at Wells Dam

Management Targets		2016 Forecast
Harvest*	HORs retained in Fisheries	1,401
	Incidental Loss of NORs	951
<i>*Partial source of broodstock</i>		
Hatchery and Weir*	Return of HORs to Hatchery	1,709
	HORs retained at Weir	289
<i>*Partial source of broodstock</i>		
Integrated Hatchery Program	Natural Origin Brood (NOB)	602
	Hatch. Origin Brood (HOB) -Okan	-
	Projected Annual pNOB-Okan	100%
	Cum pNOB	92%
	Smolt Release-Okanogan	1,100,054
Segregated Hatchery Program	Hatch. Origin Brood (HOB) -CJH	491 (289 weir)
	Smolt Release-CJH	900,000
Natural Spawning Escapement	Nat. Origin Spawners (NOS)	8,508
	Hat. Origin Spawners (HOS)	1,420
	Total Number of Spawners	9,928
	pHOS	12%
	PNI	0.89

Expected outcomes if forecast is correct and management targets are met

STATUS OF BIOLOGICAL INDICATORS (5-year Running Averages)

	Program Biological Targets	Status in 2015	Projected Status in 2016
NOS	5,250	6,915	7,722
pHOS	30%	24%	18%
PNI	0.67	0.78	0.84

KMQ 6: Are CJH Program benefits consistent with conservation of summer/fall and spring Chinook natural populations? **YES**