



Sustainable Fisheries and Hatchery Reform on the Nisqually River



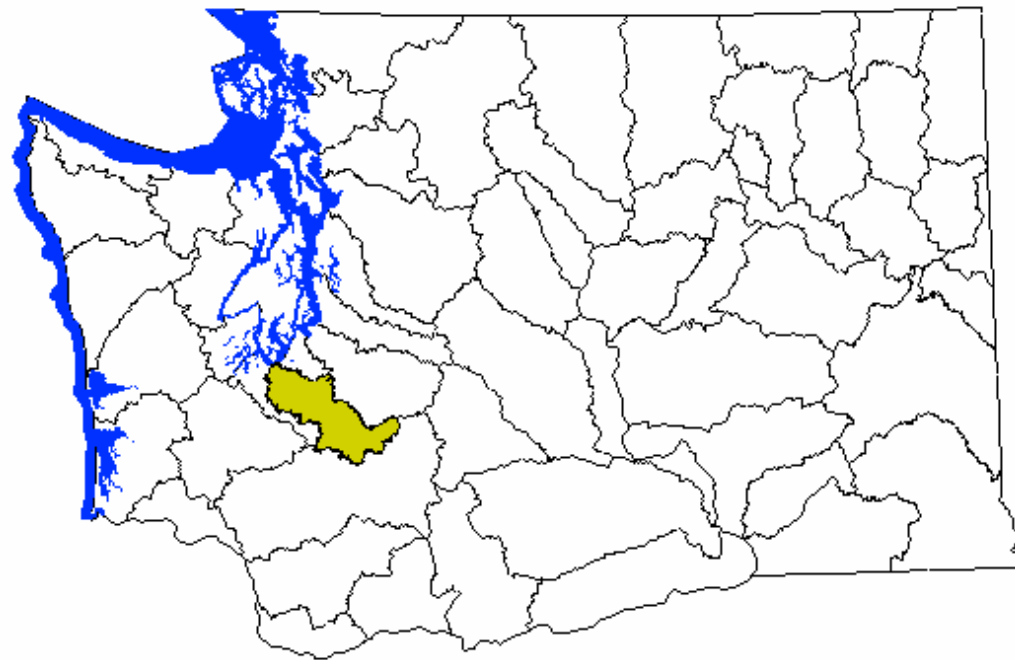
Challenges and Opportunities





**NISQUALLY
WATERSHED**





Location of Nisqually Watershed (WRIA 11)



Nisqually River Watershed



Nisqually River and Hatchery Reform

History of decline of fall Chinook:

- Decades of over fishing in the pre-terminal areas



Nisqually River and Hatchery Reform



Nisqually River and Hatchery Reform

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- Haphazard hatchery policies



Nisqually River and Hatchery Reform



Nisqually River and Hatchery Reform

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- Haphazard hatchery policies
- Alteration/loss of critical habitat features



Nisqually River and Hatchery Reform



Nisqually River and Hatchery Reform

History of decline of fall Chinook:

- Decades of over fishing in the pre-terminal areas
- Haphazard hatchery policies
- Alteration/loss of critical habitat features
- Incompatible operation of hydroelectric facilities



Nisqually River and Hatchery Reform



Nisqually River and Hatchery Reform

History of decline of fall Chinook:

- Decades of over fishing in the pre-terminal areas
- Haphazard hatchery policies
- Alteration/loss of critical habitat features
- Incompatible operation of hydroelectric facilities
- Stock management policies antagonistic to natural production



Nisqually River and Hatchery Reform



History of Stock Management Decisions:

- 1940's-1974 – State of Washington managed for mixed stock fisheries without concern for natural escapement
- 1974-1999 Co-managers manage for 1. in-river hatchery objective; 2. natural escapement



Nisqually River and Hatchery Reform

RESULT – Probable extinction of
the wild Nisqually River fall
Chinook salmon



Nisqually River and Hatchery Reform

Challenge and opportunity:

- Rebuild a natural run without the benefit of any residual genetic material of the wild stock.
- Meet both harvest and recovery objectives.





Nisqually River and Hatchery Reform

1995

Nisqually Tribe begins a recovery planning effort to address:

- need to rebuild natural stocks
- provide long term stability to fall chinook

Desire to provide:

1. Scientifically defensible strategy
2. Informed decision making
3. Clear measurable goals



Nisqually River and Hatchery Reform

Principles for new plan:

1. Contribute significantly to recovery of the ESU
2. Provide for meaningful harvest in the Nisqually River
3. Create a plan that is based on science and adapts to changing conditions.





Nisqually Chinook Recovery Plan

August 2001

Prepared by the
Nisqually Chinook Recovery Team







Nisqually River and Hatchery Reform



Goals for the 2001 recovery plan:

1. Stabilize Chinook harvest
 2. Implement habitat action plan
 3. Manage for natural escapement
 - Increase nors from 500(short term) to over 3400 at recovery, as habitat conditions improve.
 4. Use adaptive management to revise plan as necessary
- 
- 



Nisqually River and Hatchery Reform



Adaptive Management review, using new information and tools from the Hatchery Reform process lead to:

1. Recognition that the goals were too vague.
2. Realization that some goals were in conflict and required attention
3. Understanding that full recovery in the Nisqually was also dependent on actions outside of the basin.





Nisqually River and Hatchery Reform

1. Recognition that the goals were too vague.

New goal statement:

Harvest of Nisqually fall Chinook will be managed to assure a natural escapement of a minimum of 1200 NoR's with no more than 30% contribution from HoR's over the next 15 years and a terminal harvest of 10,000-15,000 consistent with escapement objective.



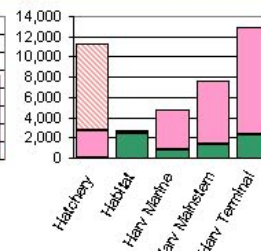
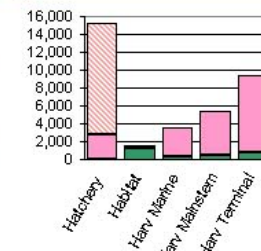
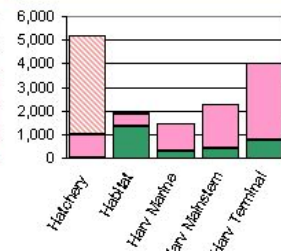
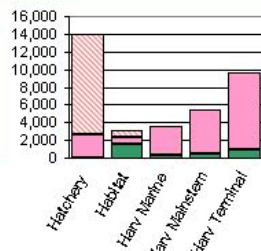
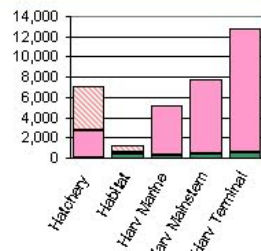
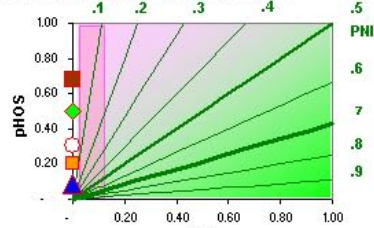
Nisqually River and Hatchery Reform

2. A significant challenge: balancing goals

Subbasin	Species	Stock Name	Current		10-12 year Habitat Plan Improvement, MSY Harvest Rate		10-12 year Habitat Plan, MSY & Reduce Hatchery Program for 30% pHos Goal		10-12 year Habitat Plan, MSY+ Weir to Control Strays		PFC, MSY for PFC, Weir to Control Strays			
Habitat:	Productivity Capacity		3.60	4,803	4.40	6,271	4.40	6,271	4.40	6,271	8.40	11,400		
	Min NOR Escapement %Kelt		1		1		1		1		1			
	Variable SAR? (Y/N)		Y		Y		Y		Y		Y			
Harvest:	Harv. Rate -Marine	[NORs HORS]	0.15	0.15	0.10	0.10	0.10	0.10	0.10	0.10	0.12	0.12		
	Puget Sound	[NORs HORS]	0.27	0.27	0.17	0.17	0.17	0.17	0.17	0.17	0.22	0.22		
	-Terminal	[NORs HORS]	0.61	0.61	0.36	0.36	0.36	0.36	0.36	0.36	0.48	0.48		
	Total Expl. Rate	[NORs HORS]	0.76	0.76	0.52	0.52	0.52	0.52	0.52	0.52	0.64	0.64		
Other Hatchery Program(s)	Program Name		Runsize	Div	Contrib	Runsize	Div	Contrib	Runsize	Div	Contrib	Runsize	Div	Contrib
Primary Hatchery Program	Broodstock Composition: Goal		pNOB	pHOS	pNOB	pHOS	pNOB	pHOS	pNOB	pHOS	pNOB	pHOS		
	Realized			30%		30%		30%		30%		20%		
				68%		50%		31%		20%		9%		
			Local	Import	Local	Import	Local	Import	Local	Import	Local	Import		
[Broodstock Smolt Release]		2700	4,039,875	2700	4,039,875	1000	1,496,250	2700	4,039,875	2700	4,039,875			
HOR Destination [Hat River]		90%	10%	90%	10%	90%	10%	98%	2%	98%	2%			
[Recruits/Spawner Fitness?]		11.0	Y	11.0	Y	11.0	Y	11.0	Y	11.0	Y			

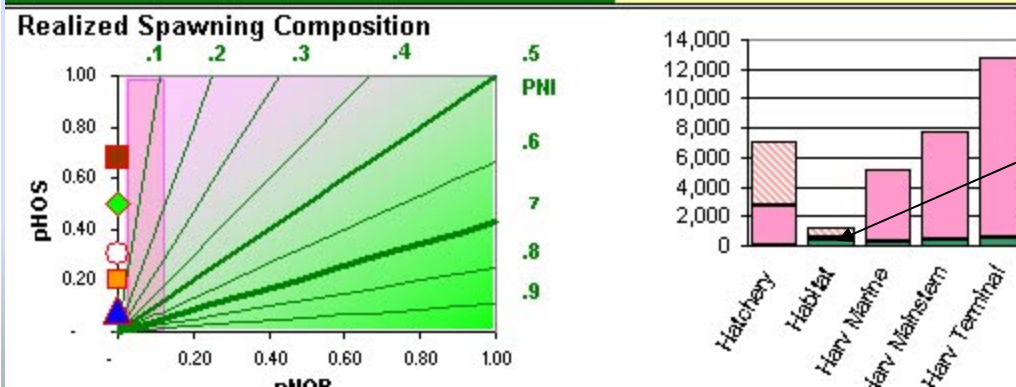
Notes/Data Sources

Realized Spawning Composition



Subbasin	Species	Stock Name	Current	
Habitat:		Productivity Capacity	3.60	4,803
		Min NOR Escapement %Kelt	1	
		Variable SAR? (Y/N)	Y	
Harvest:		Harv. Rate - Marine [NORs HORs]	0.15	0.15
		Puget Sound [NORs HORs]	0.27	0.27
		-Terminal [NORs HORs]	0.61	0.61
		Total Expl. Rate [NORs HORs]	0.76	0.76
Other Hatchery Program(s)		Program Name	Runsize	Div. Contri.
Primary Hatchery Program		Broodstock Composition: Goal	pNOB	pHOS
		Realized		30%
				68%
		[Broodstock Smolt Release]	Local	Import
		HOR Destination [Hat River]	2700	4,039,875
		[Recruits/Spawner Fitness?]	90%	10%
			11.0	y

Harvest rate too high to support natural production



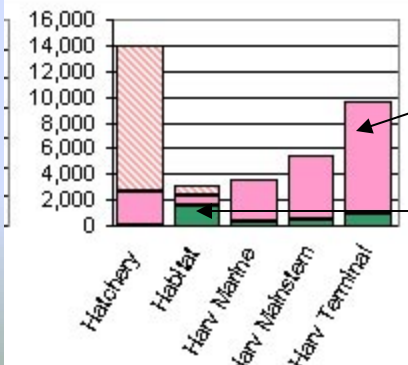
NOR's less than 400



10-12 year Habitat Plan Improvement, MSY Harvest Rate		
4.40	6,271	
1		
y		
0.10	0.10	
0.17	0.17	
0.36	0.36	
0.52	0.52	
Runsize	Div	Contr
pNOB		pHOS
		30%
		50%
Local	Import	
2700		4,039,875
90%		10%
11.0		y

This option looks at proportional harvest reductions coupled with continued success in the habitat action plan

Proportion of hatchery fish on spawning grounds too high.



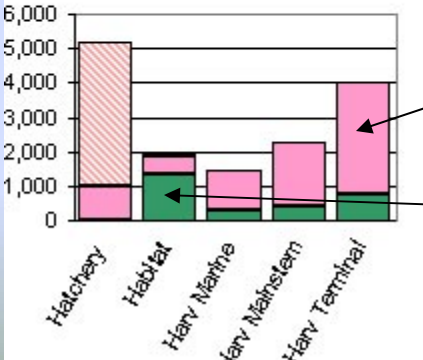
Harvest goal nearly met

Natural origin goal met



10-12 year Habitat Plan, MSY & Reduce Hatchery Program for 30% pHos Goal

4.40	6,271
1	
y	
0.10	0.10
0.17	0.17
0.36	0.36
0.52	0.52
<i>Runsize</i>	<i>Div</i>
pNOB	pHOS
	30%
	31%
Local	Import
1000	1,496,250
90%	10%
11.0	y



Proportional goal met

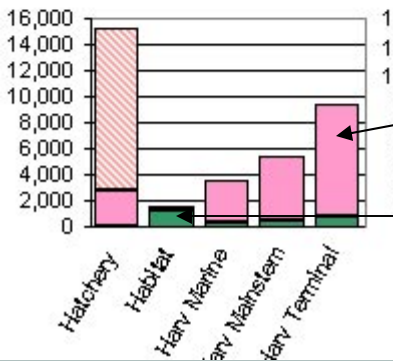
Harvest goal not met!

Natural origin goal met

**10-12 year Habitat Plan, MSY+
Weir to Control Strays**

4.40	6,271
1	
y	
0.10	0.10
0.17	0.17
0.36	0.36
0.52	0.52

Runsize	Div	Contri
pNOB		pHOS
		30%
		20%
Local	Import	
2700		4,039,875
98%		2%
11.0		y



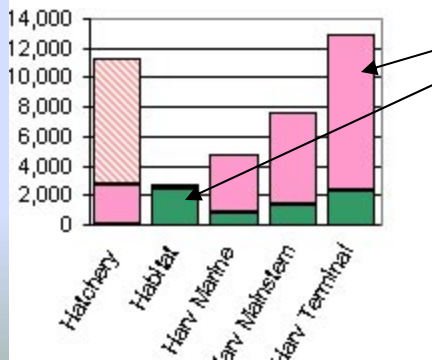
Proportional goal met

Harvest goal nearly met

Natural origin goal met



PFC, MSY for PFC, Weir to Control Strays		
8.40	11,400	
1		
Y		
0.12	0.12	
0.22	0.22	
0.48	0.48	
0.64	0.64	
Runsize	Div	Contrib
pNOB		pHOS
		20%
		9%
Local	Import	
2700		4,039,875
98%		2%
11.0		y



Long range scenario looks promising and opens up opportunities.

MSY increases with increased productivity

All goals met, but...

This balancing act requires the permanent operation of a weir.





Nisqually River and Hatchery Reform



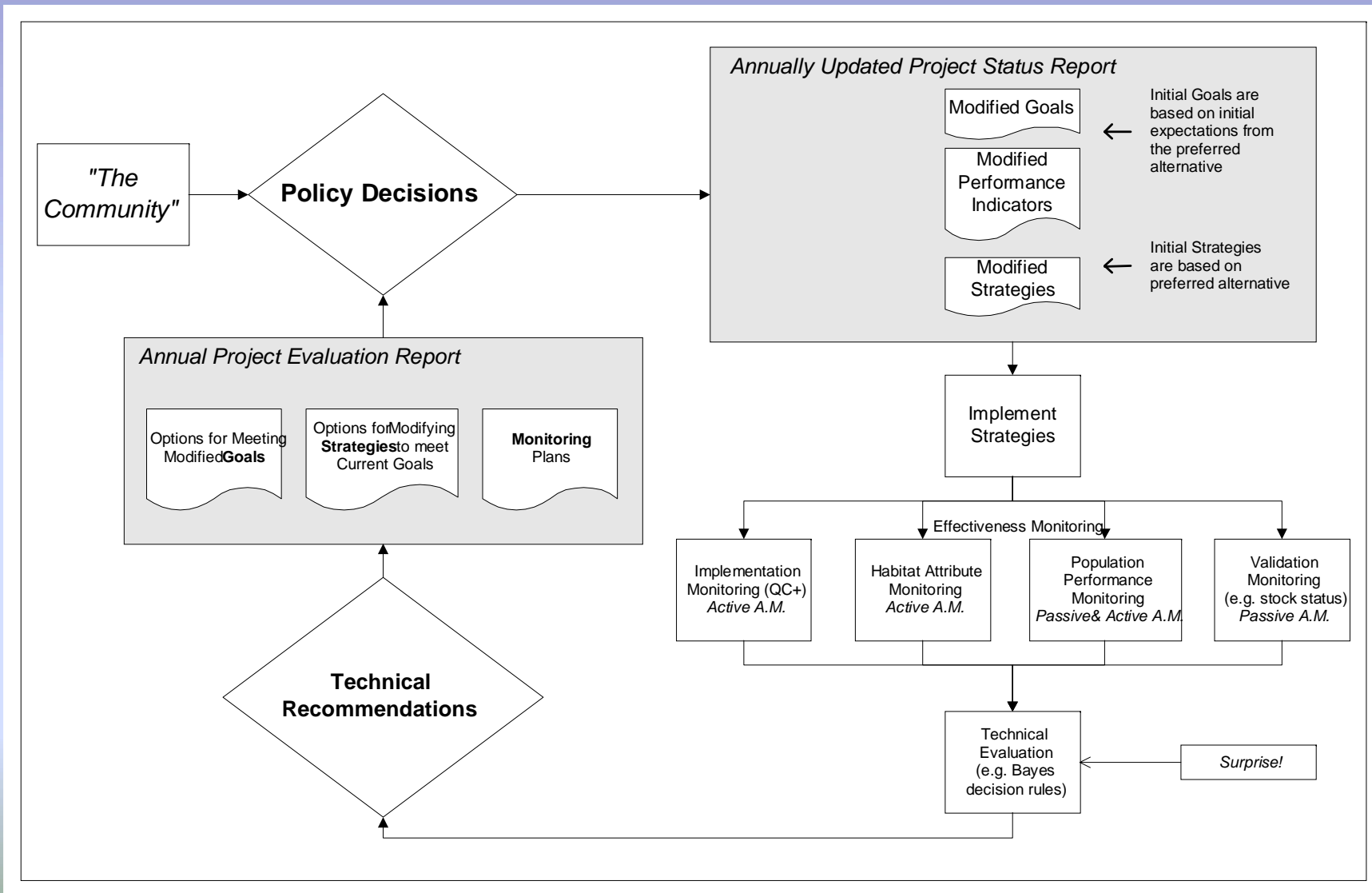
The AHA model clearly shows that salmon recovery is complex, connected, and involves significant policy decisions.

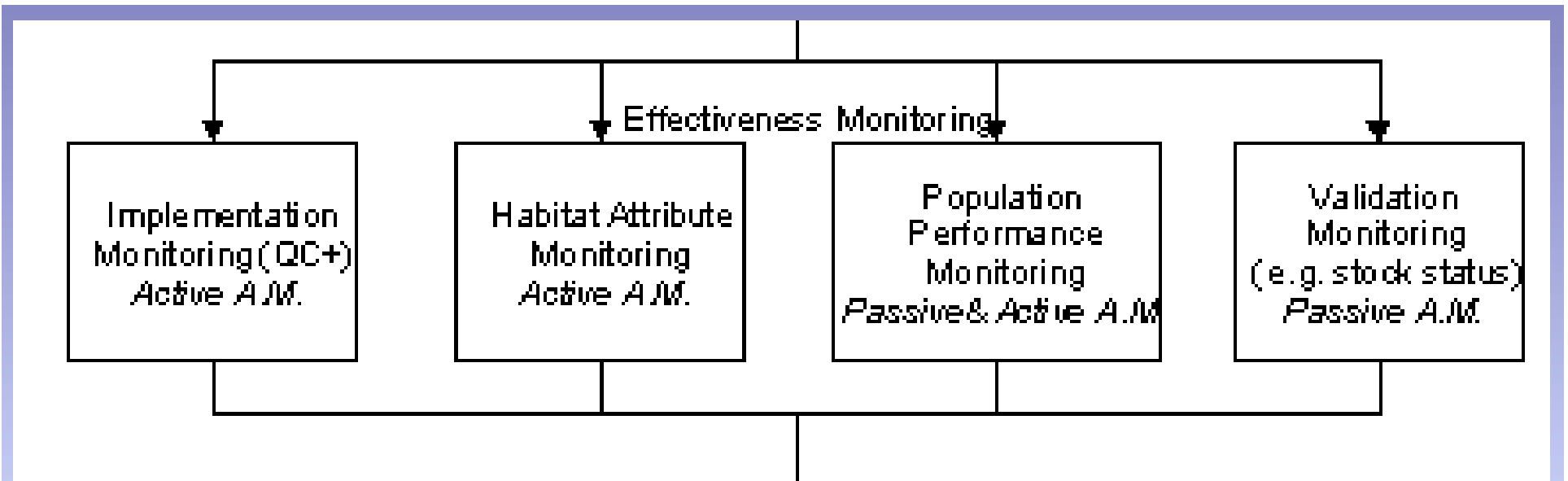
1. The H's are inextricably linked and actions, or inaction, in any area affects our ability to achieve goals.
2. The watersheds are also linked, in that decisions affecting distant harvest affect Nisqually; near-shore habitat actions throughout Puget Sound affect our ability to recover; hatchery production throughout the region will impact our efforts.



Nisqually Chinook Recovery Plan

Strategy for Success: Adaptive Management



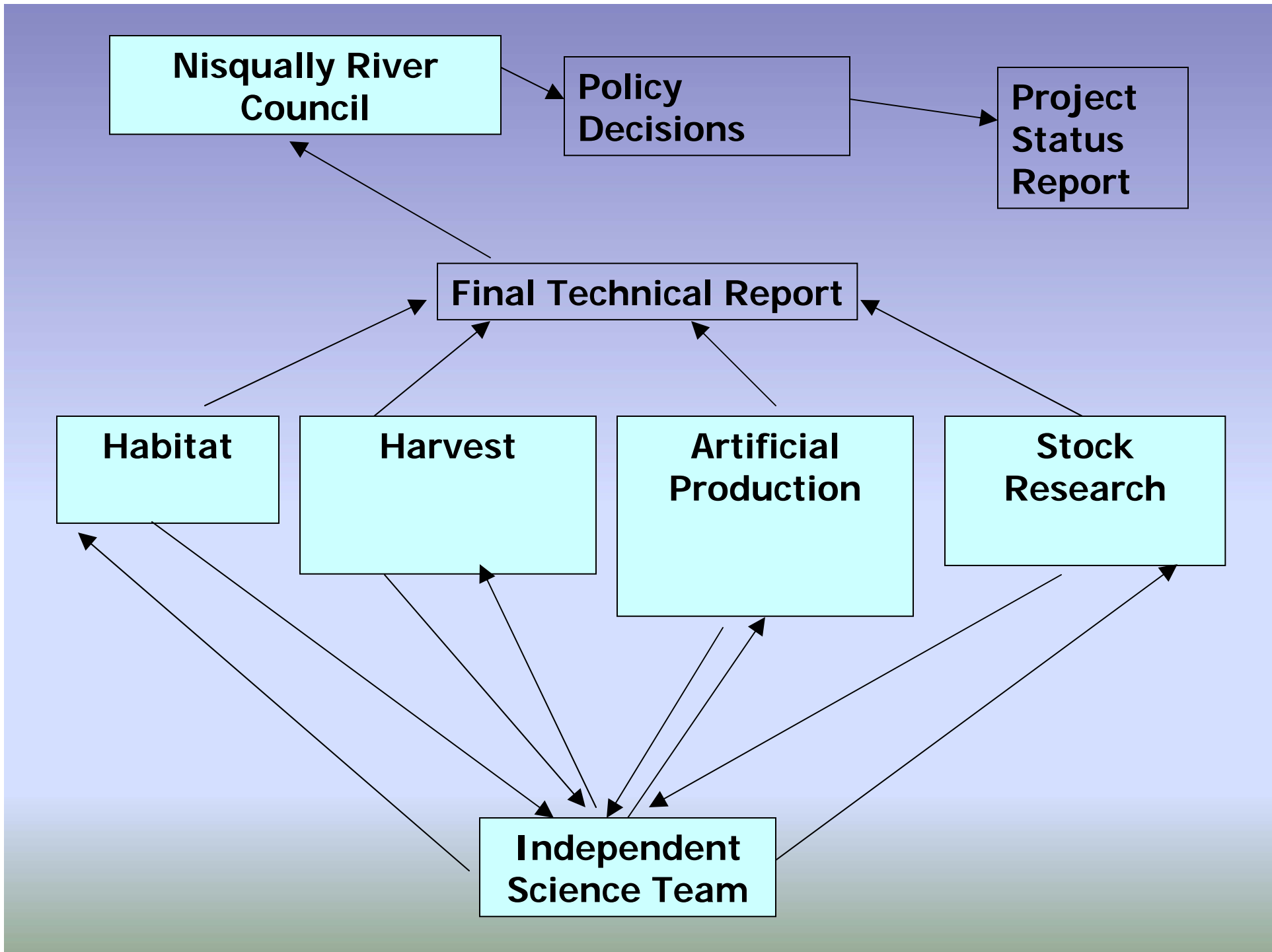


Habitat:
Tribe -
Jeanette D.,
George W.
NSH
workgroup

Harvest:
Tribe – Craig S.
WDFW -Chuck B.
NWIFC- Gary G.,
Mariana A.

**Artificial
Production:**
Tribe - Bill S.
WDFW - Eltrich
NWIFC - Ken C.,
Kyle B.

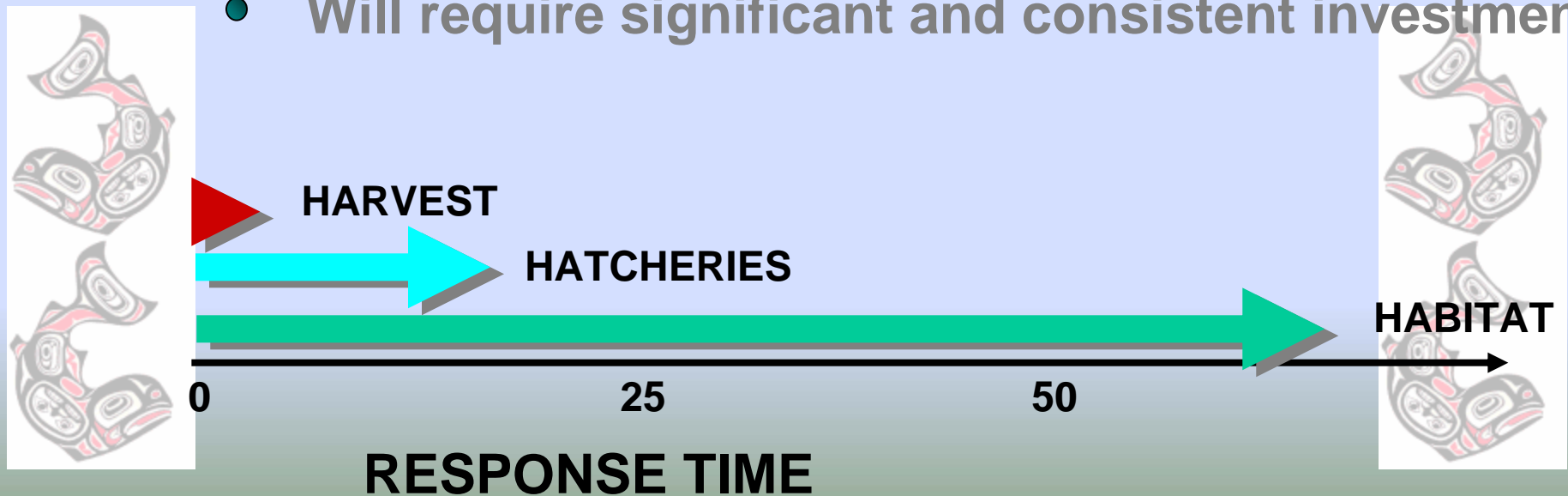
**Stock
Research:**
Tribe - Sayre H.
WDFW - John L.
NWIFC - Kyle B.



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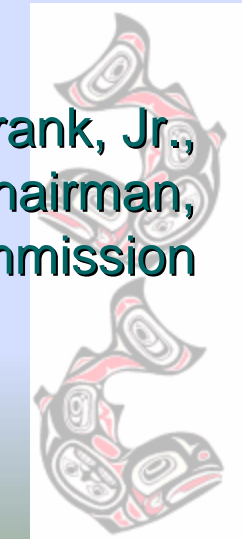
Effective use of hatcheries depends on an overall strategy for protecting salmon and salmon habitats and providing fishing opportunities

- Hatcheries need habitat
- Habitat, hatchery, and harvest planning needs to be integrated
- Will require significant and consistent investment





“We are confident that by working together... we can achieve our goal of returning wild salmon stocks to abundance. Reforming hatchery practices is another step on the road to wild salmon recovery.”



**—Billy Frank, Jr.,
Nisqually Tribal Elder and Chairman,
Northwest Indian Fisheries Commission**

