

# Fish Conservation

# Fishery Management

Jim Scott

Assistant Director, Fish Program

Washington Dept. Fish and  
Wildlife





# Presentation Outline

- 21st Century Salmon & Steelhead
- Conservation Biology
  - ✓ Viable Salmonid Populations
  - ✓ Hatchery Reform



# Why is it important?

The 21<sup>st</sup> Century Salmon and Steelhead Initiative is driving a fundamentally different approach to conservation and fishery management at WDFW.





# What is the overarching direction?

“WDFW shall manage salmon and steelhead to recovery and sustainability is a way that is science-based, well-documented, transparent, well-communicated, and accountable.”





# 21<sup>st</sup> Century Salmon & Steelhead

*Plotting a course to wild fish recovery and sustainable fisheries over 50 years*

What is different?





# Plotting a New Course...

## Traditional Approach - Fisheries

Fishery management actions focused on providing and maximizing harvest.



## 21<sup>st</sup> Century Salmon & Steelhead

“Fisheries are managed to meet or exceed ESA, recovery, and conservation goals...”



# Plotting a New Course...

## Traditional Approach - Hatcheries

Hatcheries operated as isolated fish production factories.



## 21<sup>st</sup> Century Salmon & Steelhead

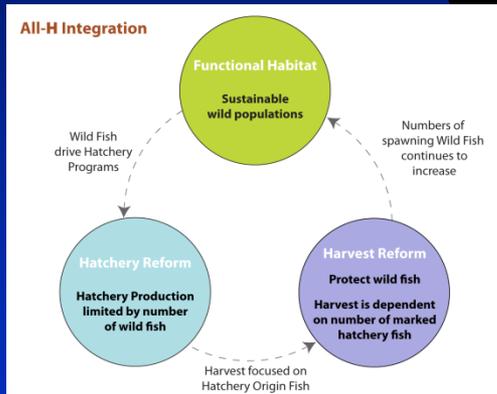
“Hatchery programs are aligned to achieve our fishery and population conservation objectives.”



# Plotting a New Course...

## Traditional Approach - Integration

Habitat, hatchery, harvest management actions developed and implemented in isolation.



## 21<sup>st</sup> Century Salmon & Steelhead

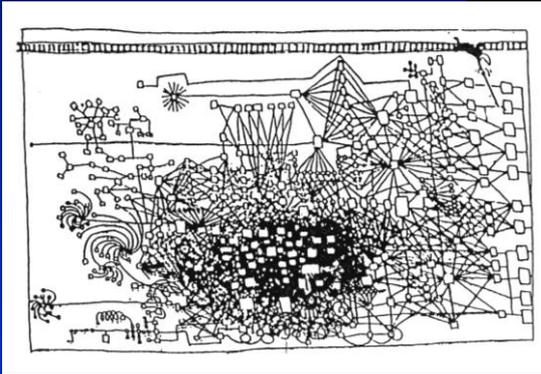
“WDFW long-term goals and actions for each population are defined in an integrated all-H framework...”



# Plotting a New Course...

## Traditional Approach – Ecosystems

Species specific fishery management plans



## 21<sup>st</sup> Century Salmon & Steelhead

“All populations contribute to a functioning ecosystem.”



# Presentation Outline

- 21st Century Salmon & Steelhead
- **Conservation Biology**
  - ✓ Viable Salmonid Populations
  - ✓ Hatchery Reform



# Conservation Biology

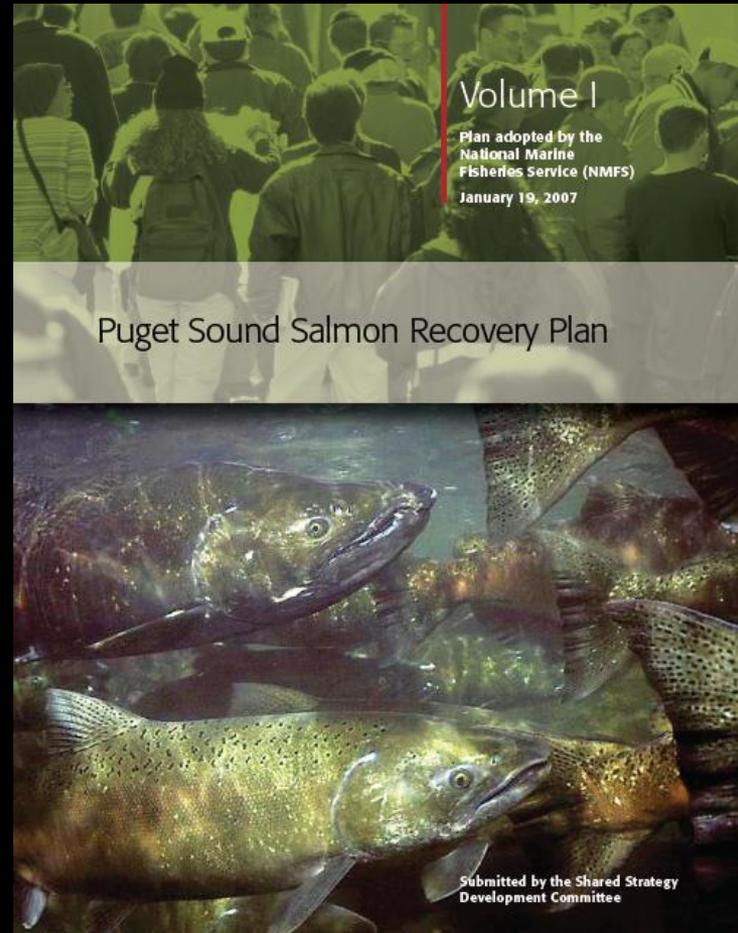
## New Foundation for Fishery Management

- Population structure
- Viable Salmonid Population (VSP)  
Characteristics



# Conservation Biology Population Structure

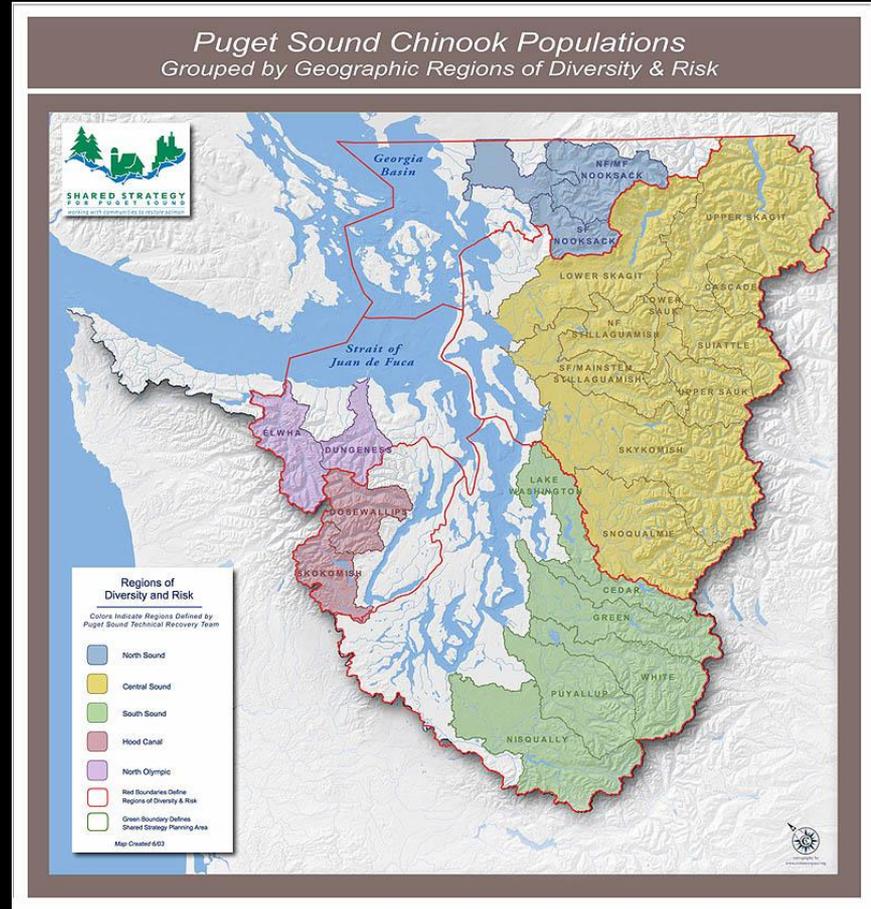
## Puget Sound Salmon Recovery Plan





# Conservation Biology Population Structure

- 5 Geographic Regions
- 22 Populations

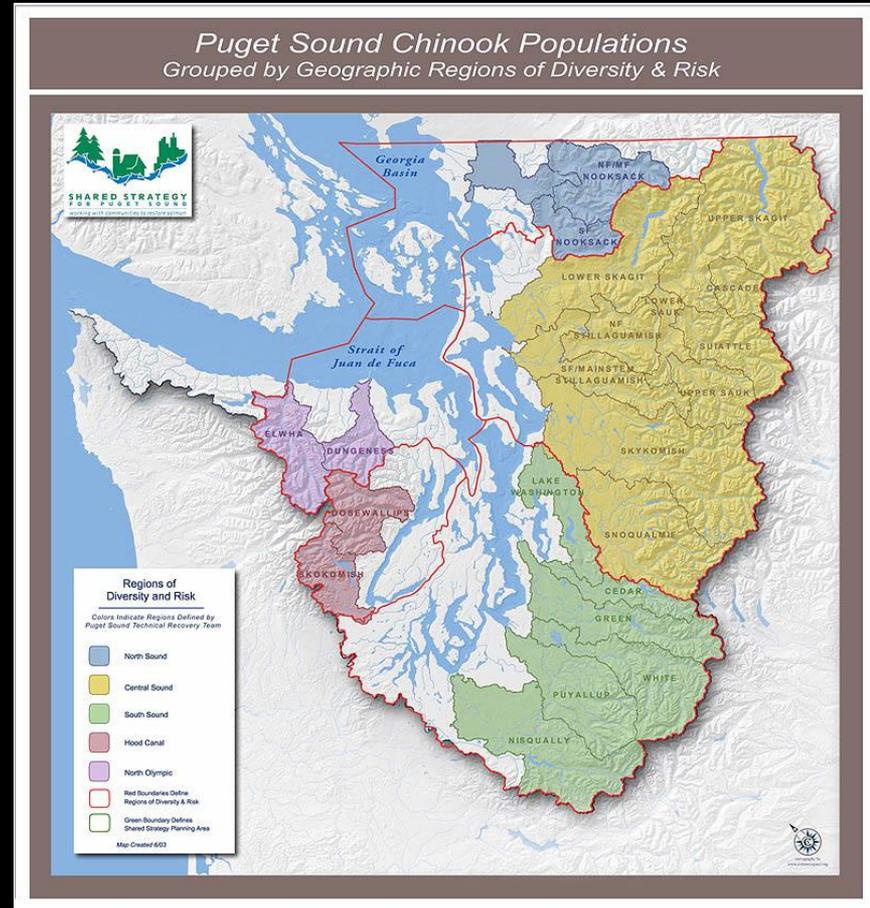




# Conservation Biology Population Structure

“NMFS will continue to assess recovery and survival of the ESU based on the progress of individual populations across the ESU relative to their role in recovery...”

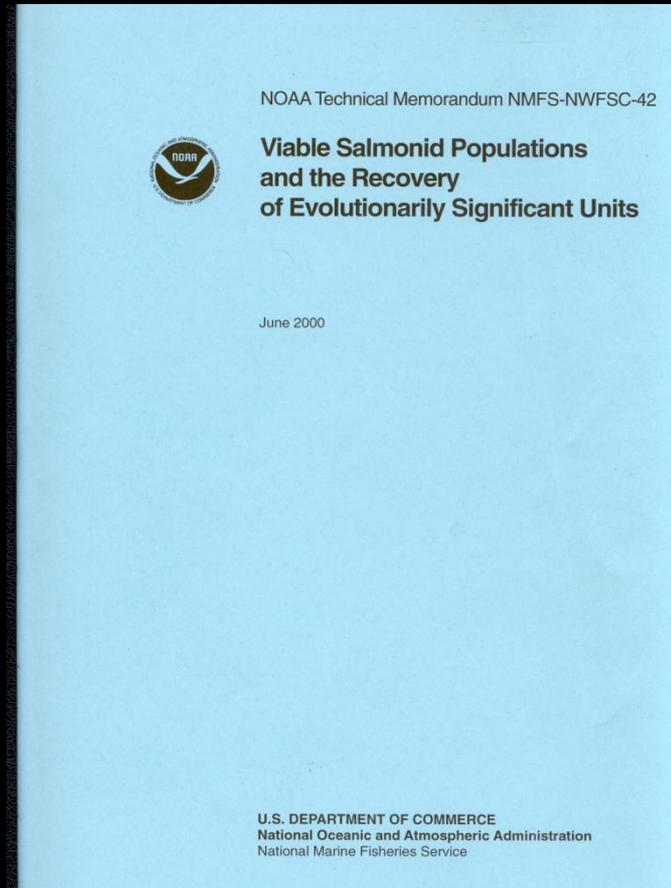
NOAA Supplement





# Conservation Biology Viable Salmonid Populations

- Abundance
- Productivity
- Diversity
- Spatial Structure





# Viable Salmonid Populations

## Abundance & Productivity

What are the implications for fishery management?

*“...harvest must not appreciably slow the population’s achievement of viable function.” NMFS 4(d) Rule*

**Question.** What is the cap that we should put on fishery mortality to assure that:

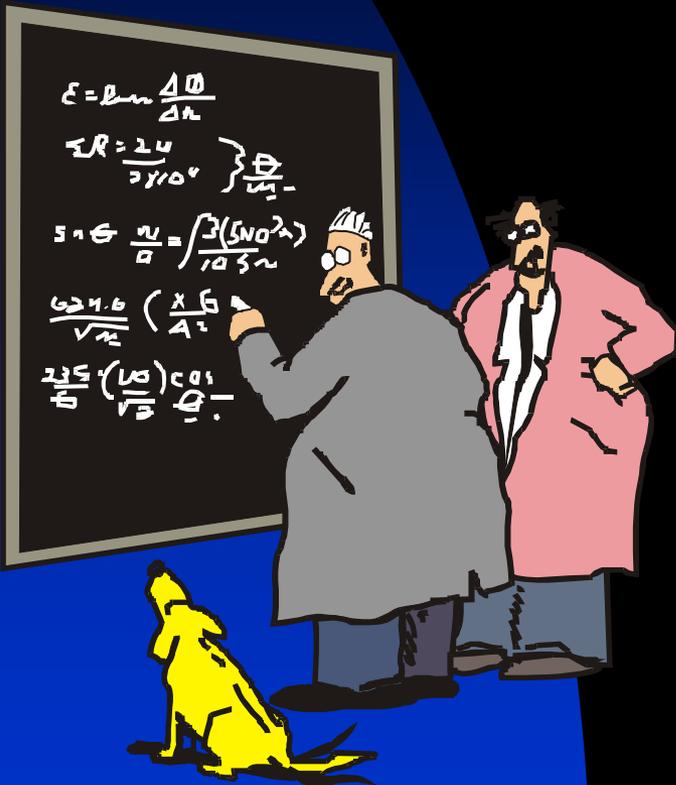
- the rate of increase in spawners is not appreciably slowed; and
- the chance of extinction is not significantly increased.



# Viabale Salmonid Populations

## Abundance & Productivity

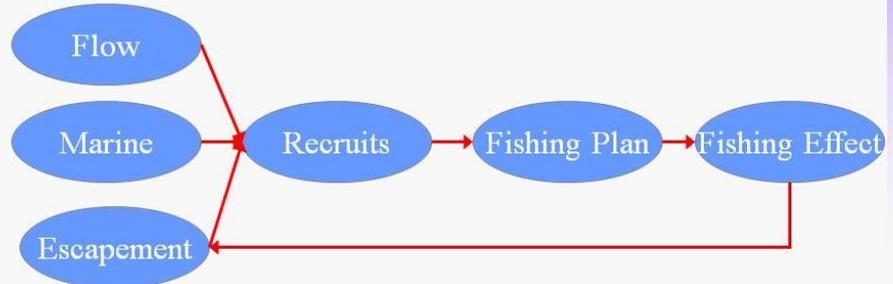
Ahhh...This is something we can put our scientists to work on!



### VRAP Application

Monte Carlo analysis incorporating:

- Stock productivity (including uncertainty)
- Environmental stochasticity
- Management error



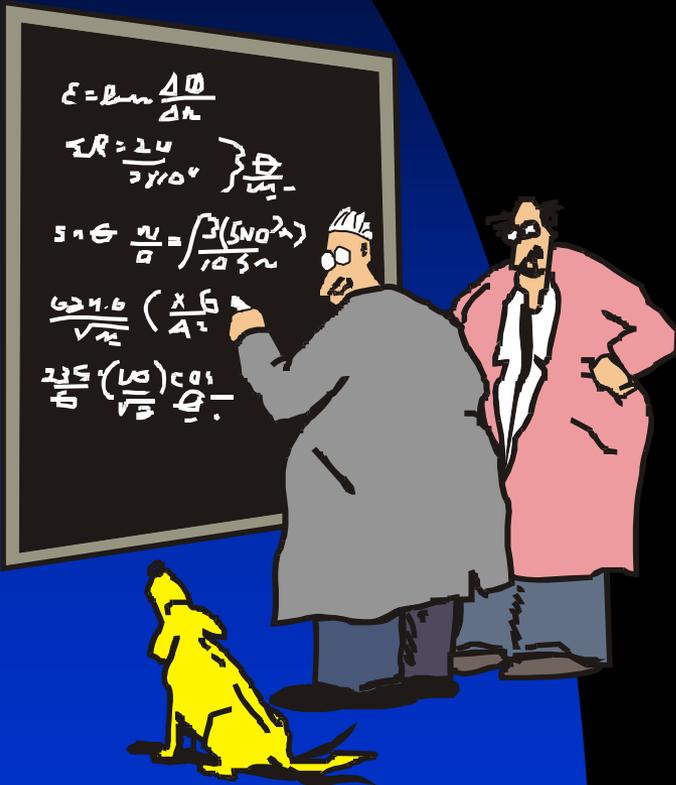


# Viable Salmonid Populations

## Abundance & Productivity

But it's actually pretty simple:

- Estimate productivity of population (adults per spawner)
- Incorporate sources of variability and uncertainty (marine survival, management error)
- Simulate different fishery regimes until population viability is appreciably affected.



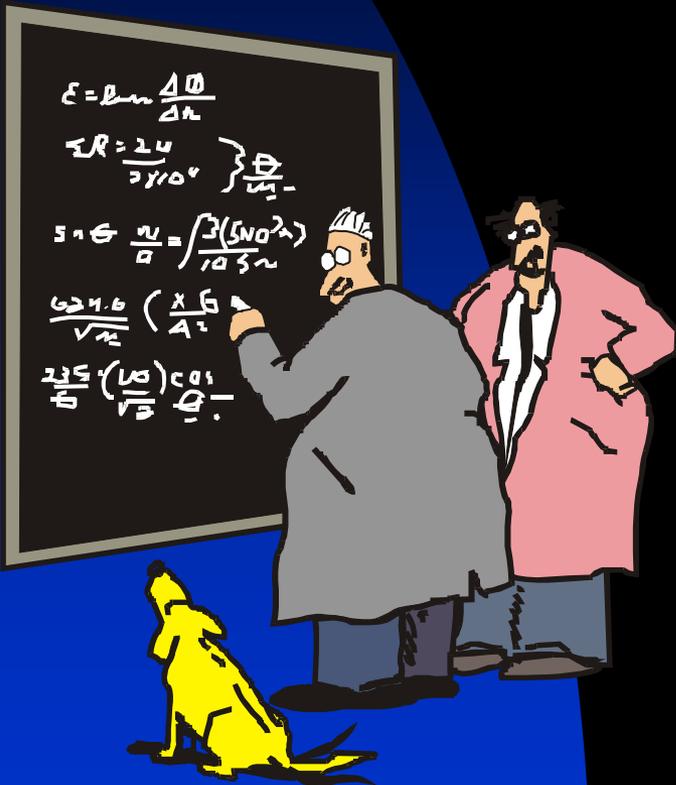


# Viable Salmonid Populations

## Abundance & Productivity

"NMFS will work with co-managers to improve and expand application of quantitative, biologically-based methods for deriving harvest objectives for Puget Sound Chinook populations."

NOAA Supplement





# Viable Salmonid Populations

## Diversity & Productivity

It's not only how many spawners,  
but what type of spawners that is  
important!

What about those hatchery fish...





# Viable Salmonid Populations

## Diversity & Productivity

What about those hatchery fish...

### Risks

**Facility**

Water Quality

Fish Passage

Intake Screening

**Genetic**

Diversity

Domestication

Inbreeding Depression

**Ecological**

Predation

Competition

Disease

**Demographic**

Broodstock Mining

Reproductive Failure





# Viable Salmonid Populations

## Diversity & Productivity

### Hatchery Reform

A scientific and systematic redesign of hatchery programs to help recover wild salmon and support sustainable fisheries.

*Hatchery Scientific Review Group 2002*

- 1) Limit the number of hatchery adults spawning in the wild.
- 2) Include wild fish in hatchery broodstock.



# Viable Salmonid Populations

## Diversity & Productivity

“NMFS strongly supports PSTRT findings...and the need for more specificity for hatchery programs in each watershed to function in a manner that is integrated with habitat capacity and harvest objectives.”

NOAA Supplement



# Viable Salmonid Populations

## Diversity & Productivity

Fishery and hatchery management must result in both the right number and type of fish in natural spawning areas!





# Key Points

- The 21<sup>st</sup> Century Salmon and Steelhead Initiative is driving a fundamentally different approach to conservation and fishery management at WDFW.
- Conservation biology is providing a new foundation for fishery management.
- Significant areas for review and improvement in the RMP are evident.
  - Assess progress of individual populations across the ESU relative to their role in recovery
  - Expand application of quantitative, biologically-based limits on fishery impacts
  - Improve integration of harvest and hatchery management