Yukon River Chinook Stock Restoration Considerations:

Yukon Community Meetings

November, 2014

Overview

- Objective
- Chinook Decline: Background
- Supporting Recovery: An “All H” Approach
  - Harvest Management
  - Habitat
  - Hatcheries
- Developing a Yukon River Chinook Stock Restoration Strategy
- Next Steps

Objective

- Why are we here today?
  - To get your feedback on options to support Yukon River Chinook stock restoration.
  - Information will be used to:
    - Inform Yukon River Panel's discussions in 2014
    - Advise YRP JTC in developing bilateral strategies (linked to call for proposals through R&E fund)

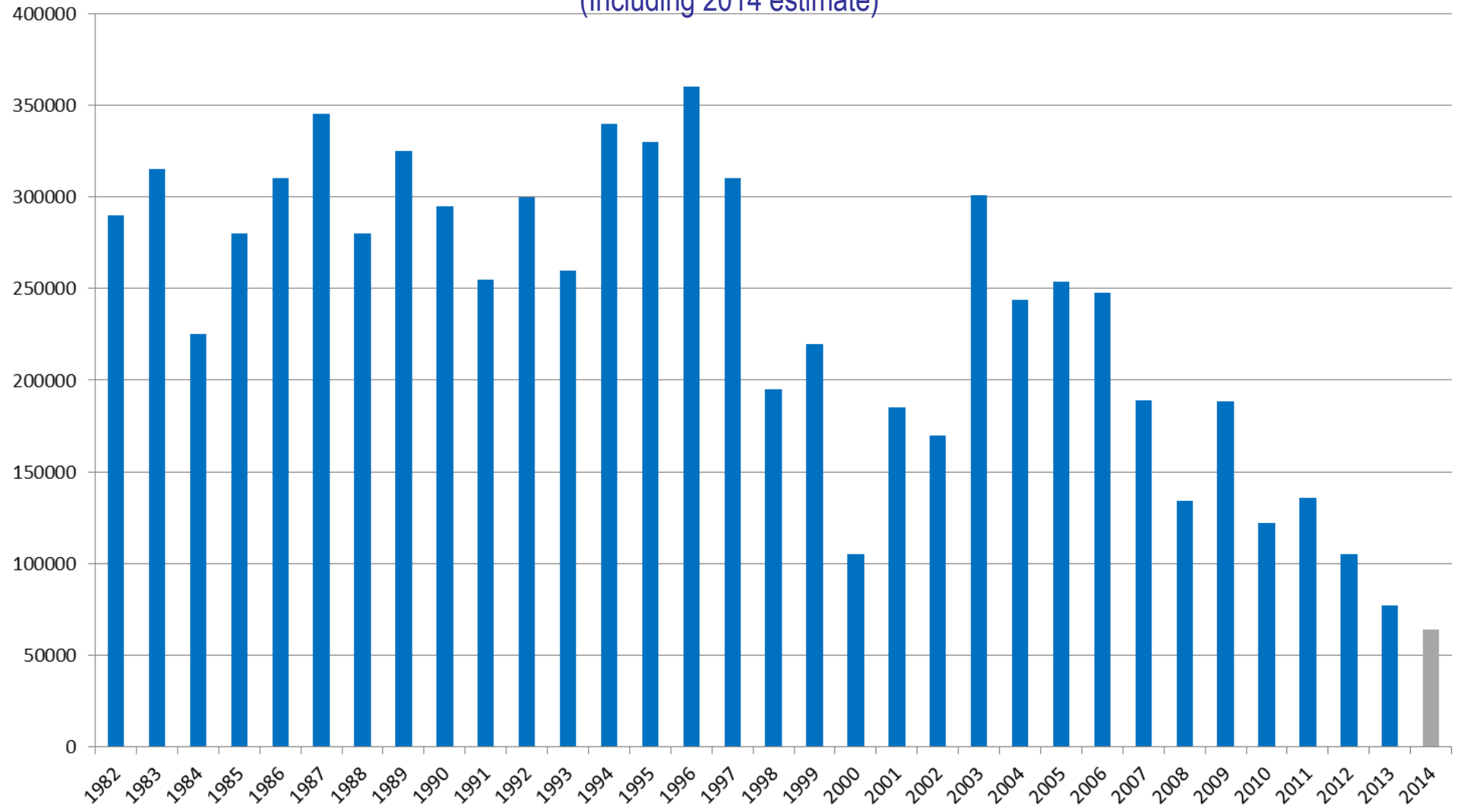
Chinook Decline: Background

- The average number, size, and age of adult Canadian-origin Chinook salmon returning to the Yukon River has declined.
- Speculation that contributing factors include previous size-selective harvest and more recent marine conditions in the Bering Sea.
- Recruits per adult* have been declining over the past cycle.

Fisheries and Oceans Canada | Pêches et Océans Canada

Drainage-wide Yukon River Chinook Salmon Population Status

(Including 2014 estimate)



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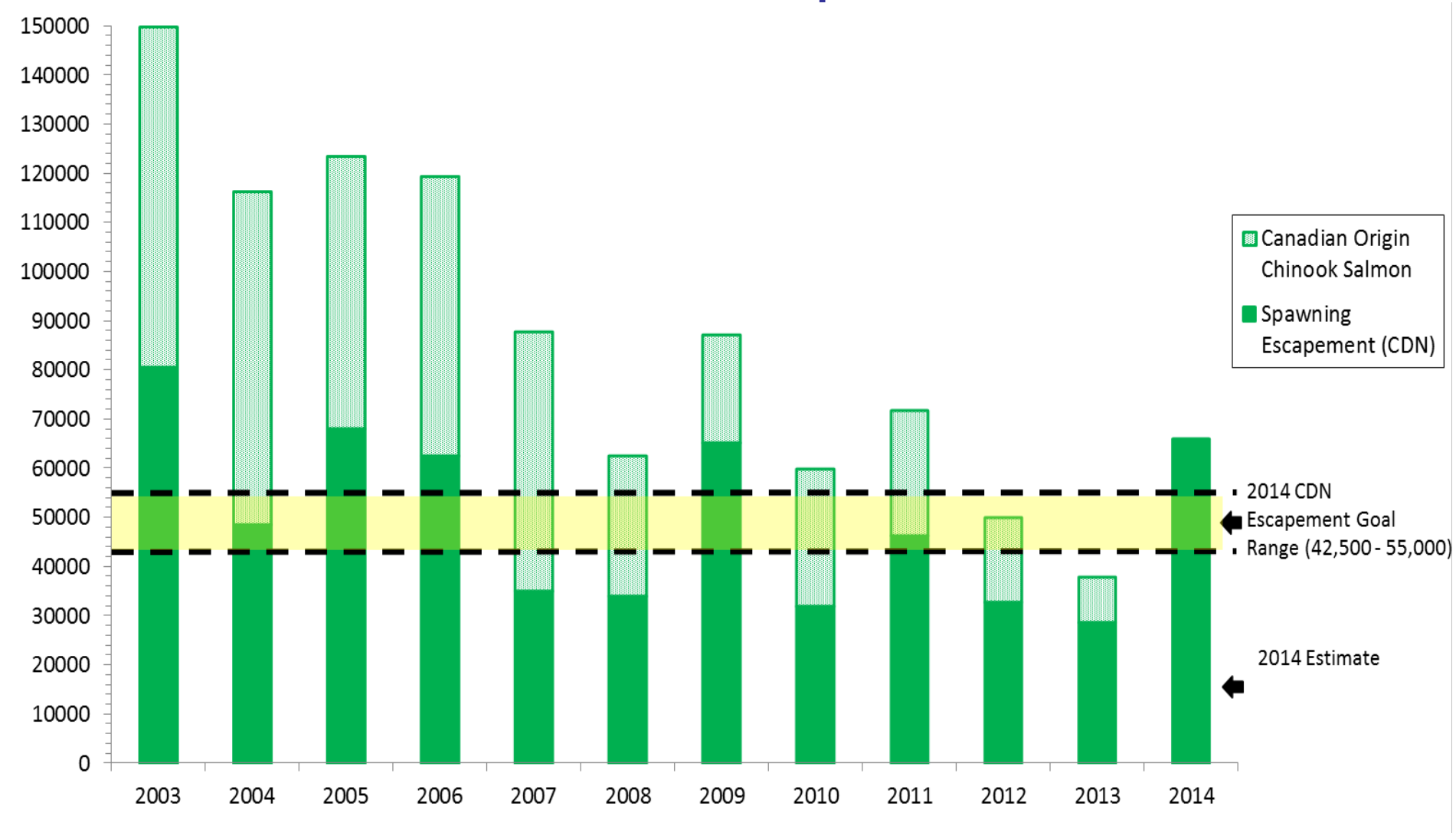
Canadian-origin Yukon River Chinook Salmon Population Status



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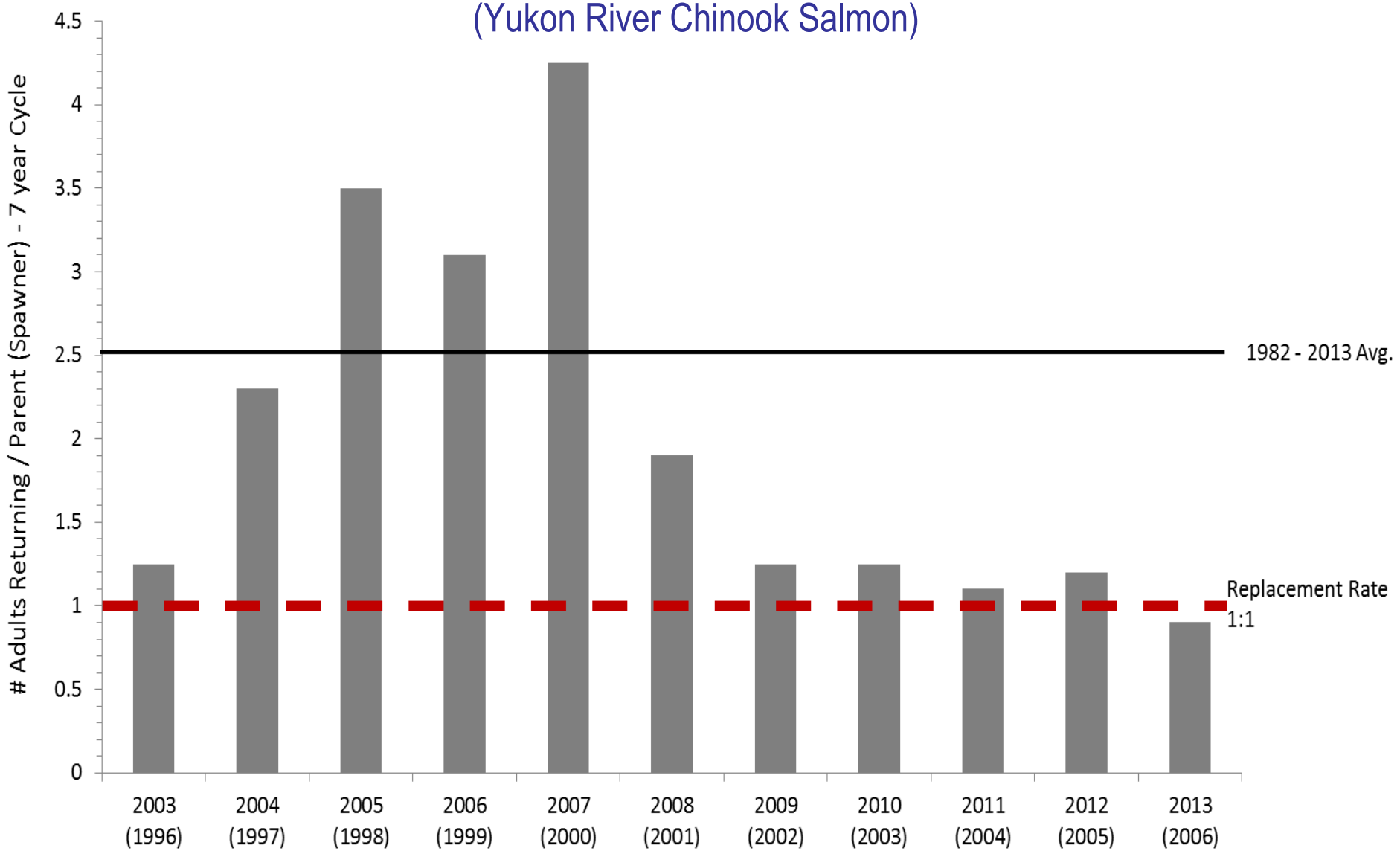
Number of Adult Recruits / Spawner

(Yukon River Chinook Salmon)



Supporting Recovery: Harvest Management

- Existing harvest management tools:
  - Closures
  - Timing windows
  - Gear restrictions

- Opportunities for new harvest management tools:
  - Size-selective harvest
  - Sex-selective harvest

Supporting Recovery: Habitat

- Developing / maintaining the integrity of suitable, available spawning and rearing habitat through protection/ conservation, restoration, and enhancement.
- Improves water quality, restores fish passage, improves spawning success; provides additional cover, spawning / rearing / overwintering habitat.
- Habitat conservation and restoration projects often require extensive community partnership and commitment, technical capacity, and long-term resourcing.
- Limited opportunity for enhancement in northern “pristine” environments.

Supporting Recovery: Hatcheries

Definitions:

- Stock Restoration
  - Returning a wild salmon stock to its natural production level.
  - Employed when a salmon population is unable to sustain itself or readily recover to natural level.
- Stock Enhancement
  - Expanding a wild salmon stock beyond its natural production level.
  - Employed to increase the number of salmon to create harvest opportunities *(sustainable reproduction not the goal).*

Supporting Recovery: Hatcheries

- Fish Hatchery
  - A facility where fish are spawned, eggs fertilized, and fry raised until desired size. Fish are raised for release into the wild.
  - Most hatcheries are built on land.
- Fish Farm
  - A commercial fish hatchery operation where fish are raised (farmed) for commercial sale and not intended for release into the wild.
  - Built on water using net pens (Atlantic salmon) or land (variety of species).

Supporting Recovery: Hatcheries

- Ocean Ranching
  - Juveniles raised in a hatchery and released in to the wild specifically to support “fisheries”. All adult fish are intended to be harvested for consumption or hatchery brood stock. Enabling adult spawning in the wild is not he intention.
  - A combination of land and water based.

Supporting Recovery: Hatcheries

- Hatchery projects provide for higher survival rates than would occur in the wild.
- In salmon, typically the greatest benefit occurs at the egg to fry or smolt stage:
  - Wild = fertilized egg to smolt survival approximately 4%*
  - Hatchery = egg to smolt survival improves to more than 75%
- Hatcheries are one way to contribute to an overall stock restoration strategy or objective.

Hatchery Programs:
Salmonid Enhancement Program (SEP)

1. Conservation
   - Significant risk of extinction
2. Rebuilding
   - Populations below the capacity of habitats
3. Assessment
   - Production of “marks” for fishery assessment
4. Harvest Augmentation
   - Increased harvest opportunities

Hatcheries: Benefits

- Hatcheries can be used successfully to restore stocks that have declined or have been depleted.
- However, hatcheries do come with significant financial, capacity, and ecological considerations.

Hatcheries: Concerns

- Mortality considerations:
  - Broodstock collection/holding is difficult; mechanical and technical difficulties in the hatchery (disruption in power/water supplies); disease outbreaks.
- Genetic considerations:
  - Survival of the fittest does not occur; breeding approach does not mimic wild; potential changes in behaviour, life history, and survival.
- Behavioural / ecological considerations:
  - Potential changes in feeding behaviour; potential for negative interactions with wild fish; changes in life history; and increased straying.

Hatcheries: Guidance

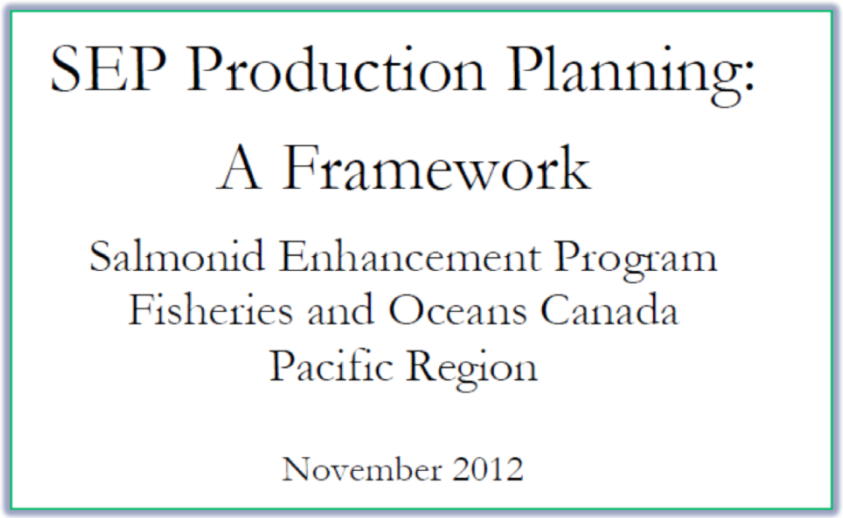
- Designing a hatchery program that will improve survival at certain life stages without affecting wild populations:
  1. Approach should be determined based on the status of the wild population;
  2. Promote local adaptation of natural and hatchery populations;
  3. Minimize adverse ecological interactions between hatchery and natural origin fish;
  4. Maximise survival of hatchery fish, consistent with conservation goals.

Developing a Yukon River Chinook Stock Restoration Strategy

- Decision Framework:
  - Biological and physical parameters including freshwater habitat requirements, life history factors, productivity constraints, and habitat impacts;
  - Restoration alternatives, including habitat restoration and improvement, fish passage, as well as artificial propagation alternatives including hatcheries and incubation;
  - Technical and logistical considerations such as water quality limitations, location, proximity to support systems, costs and maintenance;

Developing a Yukon River Chinook
Stock Restoration Strategy cont'd

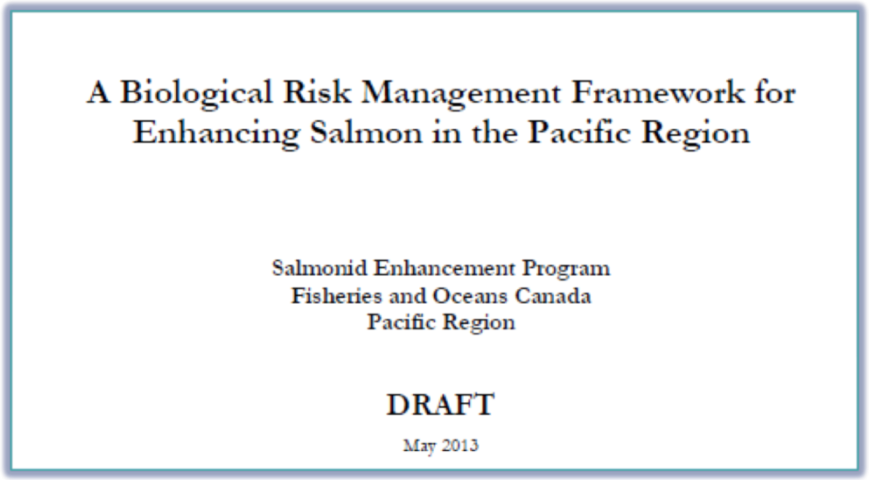
- A risk assessment to balance the benefits against the potential for undesirable consequences;
- Regulatory and policy considerations; and
- Physical and biological monitoring feasibility and effectiveness.


SEP Production Planning:

A Framework

Salmonid Enhancement Program
Fisheries and Oceans Canada
Pacific Region

November 2012


A Biological Risk Management Framework for Enhancing Salmon in the Pacific Region

Salmonid Enhancement Program
Fisheries and Oceans Canada
Pacific Region

DRAFT

May 2013

Canada

Next Steps

- Yukon River Panel, December 2014
- On-going community engagement and involvement
- Stock Restoration Strategy; partnership:
  - Yukon First Nations
  - Renewable Resources Councils
  - Yukon Salmon Sub-Committee