

**NOAA
FISHERIES**

**West Coast
Fisheries
Science
Centers**

10.2 Summary of successes, challenges and opportunities

May 4, 2015

Organization of our salmon science

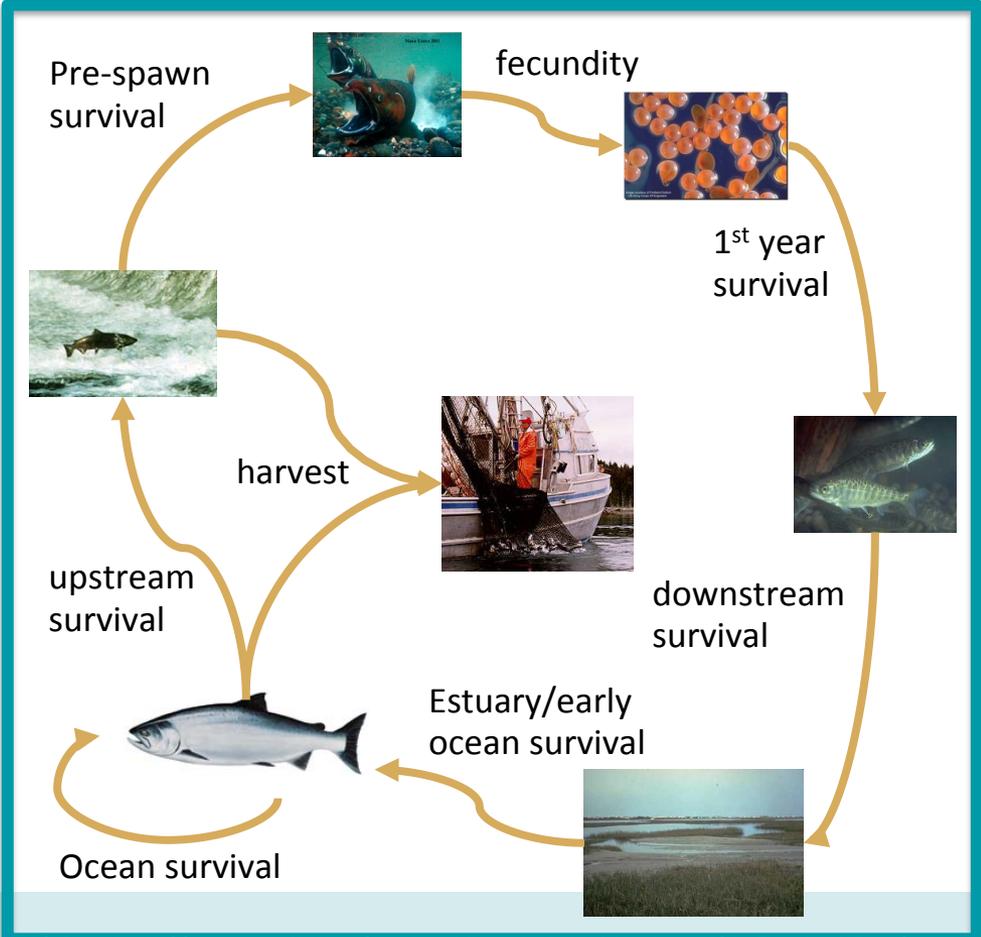
ESU viability assessment

- Status reviews
- Technical recovery planning
- VSP
- Monitoring

- Freshwater habitat research
- Climate
- Riverine survival
- Estuarine ecology
- Ocean ecology and harvest
- Hatcheries
- Evolution and diversity
- Life cycle modeling and synthesis

Evaluation and treatment of threats

- Biological opinions
- Recovery plans



Where does it all come together?

ESU viability assessment  Evaluation and treatment of threats

- Life cycle modeling
- Status reviews
- Recovery plans

Overarching

- Successes
 - Highly qualified, motivated staff
 - Good ties between science and management
 - Science has made a big difference in directing recovery
- Challenges
 - Salmon recovery will take a long time and lots of resources
 - Funding has been flat or declining as costs have increased
 - % of funding on salaries makes new priorities difficult
 - Reliance on external funding
 - Leverage of emergency of the day
- Opportunities
 - Some ESUs are approaching delisting goals for some criteria
 - West coast region merger
 - New technology
 - Greater focus on ecosystem approaches to management



Theme: Status assessment and recovery

- Successes
 - Framework for identifying DPS
 - Framework for developing recovery goals (VSP)
 - Buy-in from co-managers on the whole framework
 - Data compilation and management system
 - Methods widely used
- Challenges
 - Scope of the problem
 - Big environmental challenges
 - Multiple impacts across the lifecycle
 - Tensions between mandates
- Opportunities
 - Integration with ecosystem, multispecies management

Theme: Freshwater habitat science

- Successes
 - Shifting thinking to process based restoration
 - Criteria for habitat restoration
 - Development and application of monitoring methods for habitat
 - Changed paradigm on contaminant effects
- Challenges
 - Scale mismatch between activities and population response
 - Measuring long-term effects
 - Extrapolating measurements to non-measured watersheds
- Opportunities
 - Remote sensing
 - New technologies
 - Increasing emphasis on habitat

Theme: River survival

- Successes
 - Developed technologies to greatly improve survival on the Columbia
 - Heading in that direction on the Sacramento
 - Developed technologies to monitor fish migrations
- Challenges
 - Some life stages too small to tag
 - Ecological interactions in large rivers
 - Effects of climate change – everything can change
 - Impassible dams
- Opportunities
 - Reintroductions above dams
 - Dam removals and ecosystem response
 - New technologies, applications to new systems

Theme: Estuary and ocean science

- Successes
 - Demonstrated the importance of life history diversity
 - Habitat actions lead to diversity
 - Maintaining ocean sampling program
 - Ocean indicators used by others
 - Progress on mechanisms underlying ocean survival
- Challenges
 - Trophic sampling
 - Maintaining funding
- Opportunities
 - A lot of potential restoration in estuary
 - More coordination with other marine survey work
 - Increasing use of biotechnology

Theme: Harvest science

- Successes
 - Developed analytical methods to evaluate management strategies
 - Genetic stock ID and parent based tagging
- Challenges
 - Less data over time
 - Succession issues
- Opportunities
 - Greater use of new technology
 - More incorporation of environmental variables
 - Better forecasting

Theme: Hatchery science

- Successes
 - Preventing extinction (e.g. Redfish Lake sockeye, Santa Cruz coho)
 - Better understanding of effects
 - Science is being used by management
 - Interdisciplinary approach
- Challenges
 - Controversy
 - Reluctance to do large experiments
- Opportunities
 - Heading toward a consensus among federal, state, tribal agencies on a pragmatic approach
 - Greater appreciation for ecosystem interactions and hatcheries (e.g. marine mammals)
 - New technologies such as cheap high throughput sequencing will help address some questions

Theme: Evolution and diversity

- Successes
 - Greater focus on diversity
 - Developed technologies to measure diversity
 - Put in lifecycle models
- Challenges
 - Developing quantitative links to viability
 - Keeping up with technology change
 - Species biology challenging
- Opportunities
 - Increased attention to evolution issues
 - New approaches, new technology
 - Strong links to climate change

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- Ocean ecology and harvest
- **Hatcheries**
- **Evolution and diversity**
- Life cycle modeling and synthesis

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