Chum Salmon Recovery in Oregon tributaries to the Lower Columbia River

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History of decline

- Chum have broadest distribution
  - Sacramento to Mackenzie River
  - Arctic to Korea
- Historic runs in Columbia River estimated at over a million
  - Commercial landings 700,000 in 1928
- Precipitous decline in the 1930's
  - Loss of spawning habitat
  - Loss of access to spawning habitat
  - Changes to estuary ecology
  - Altered hydrology
  - Predation/ harvest
  - Other causes?

Chum life cycle

- Fall chum return in October
- Spawn in lowest reaches of tributaries and mainstem
- Fry emerge and outmigrate in early spring
- Brief estuary residence
- Return to spawn at age 3-5 (age 4 is most common)

Photo by nicomeklhatchery.com

Listing and Status

- Currently, hundreds to thousands of chum return
  - 16 historic populations in Columbia River (90% of which are extirpated)
  - Limited current distribution (mostly in Washington)
    - Grays River, Hardy/Hamilton/Ives Island, mainstem Columbia River at Multnomah Falls and Horsetail Falls, I-205 spawning aggregates
- Listed as threatened under Endangered Species Act in 1999

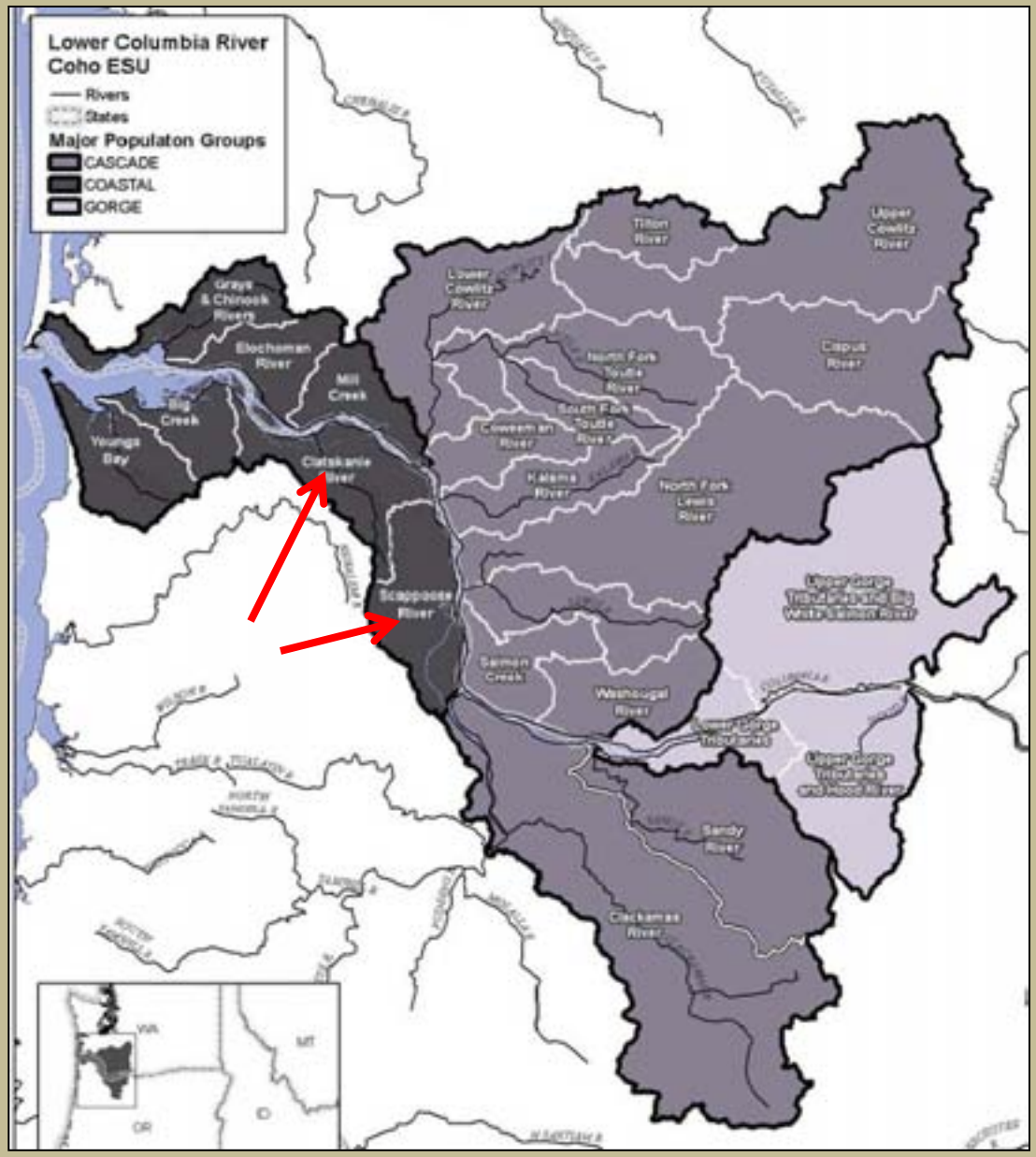
Ecological value of chum restoration

- Clean gravels
- Nutrient input
  - Historically, over 15 million pounds!
  - Measurable effects on growth of riparian vegetation
- Prey source
- Support salmon conservation

- Keystone species in aquatic and terrestrial ecosystems
- ODFW priority to rebuild populations

Recovery planning

- Chum Recovery Strategy
  - Identifying and addressing limiting factors
  - Re-establish chum populations
  - Monitor effectiveness
- Prioritize efforts by geographic strata
  - Initial efforts in coastal stratum
  - Clatskanie and Scappoose



Chum Reintroduction Project

- Habitat restoration
- Recolonization
- Reintroduction
  - functionally extirpated: restoration and recolonization alone may be insufficient
  - Informed by successful projects in Washington
- Monitoring
- Baseline data

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Reintroduction

- Brood stock source
- Brood stock development
- Selecting reintroduction sites
- Potential outplanting strategies
- Evaluating effectiveness of strategies
- Monitoring

Reintroduction: brood stock source

- Genetics
- Donor population size
- Proximity to recipient populations
  - Considering life-history traits
- Grays River

Reintroduction: egg take

- 5 years of egg collection at Grays River
  - Adult fish captured in October
  - Eggs fertilized, thermally marked, then transferred to Big Creek
  - Total egg transfer ~ 30% of egg take in Grays R.
    - 115,000 eggs received in 2010
    - 113,500 eggs received in 2011

Reintroduction: rearing

- Reared to fed fry (60-65 mm FL)
- Marked with a blank coded wire tag (CWT)
- Only chum marked with CWT in Columbia R.

Reintroduction: fry release

- April 1 release (before hatchery coho released)
- Released at night in Big Creek tide water on an ebbing tide
- 107,000 fry released in 2011

Reintroduction: brood stock development

- 12 years of hatchery releases from Big Creek
  - 3 generations
- Most chum should return at age 4, but some may return at age 3 (fall 2013) or 5
- Excess returns will be used for outplanting into selected systems

Reintroduction: site selection

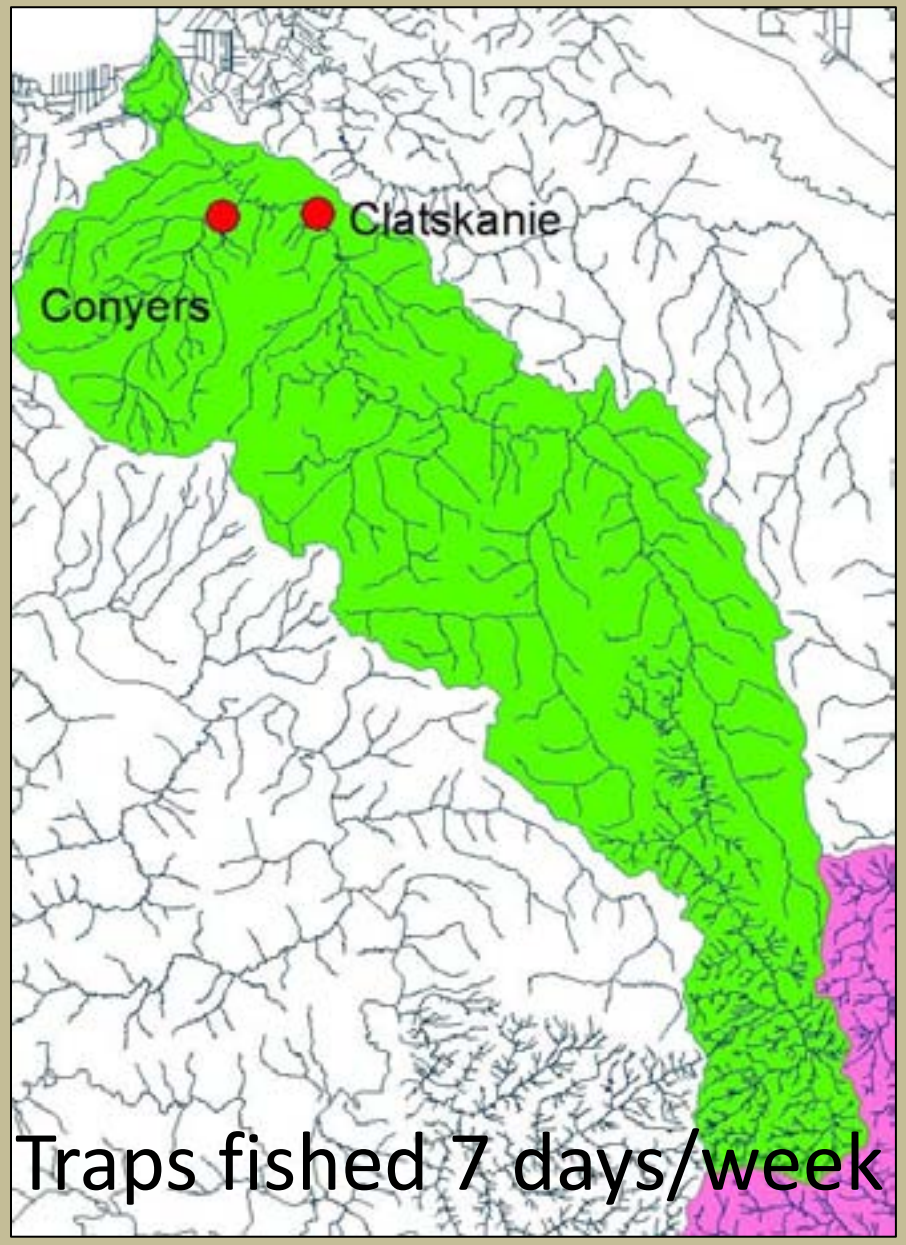
Considerations include:

- Quality and abundance of spawning habitat
- Presence of predators/ proximity to hatchery releases
- Limiting factors addressed

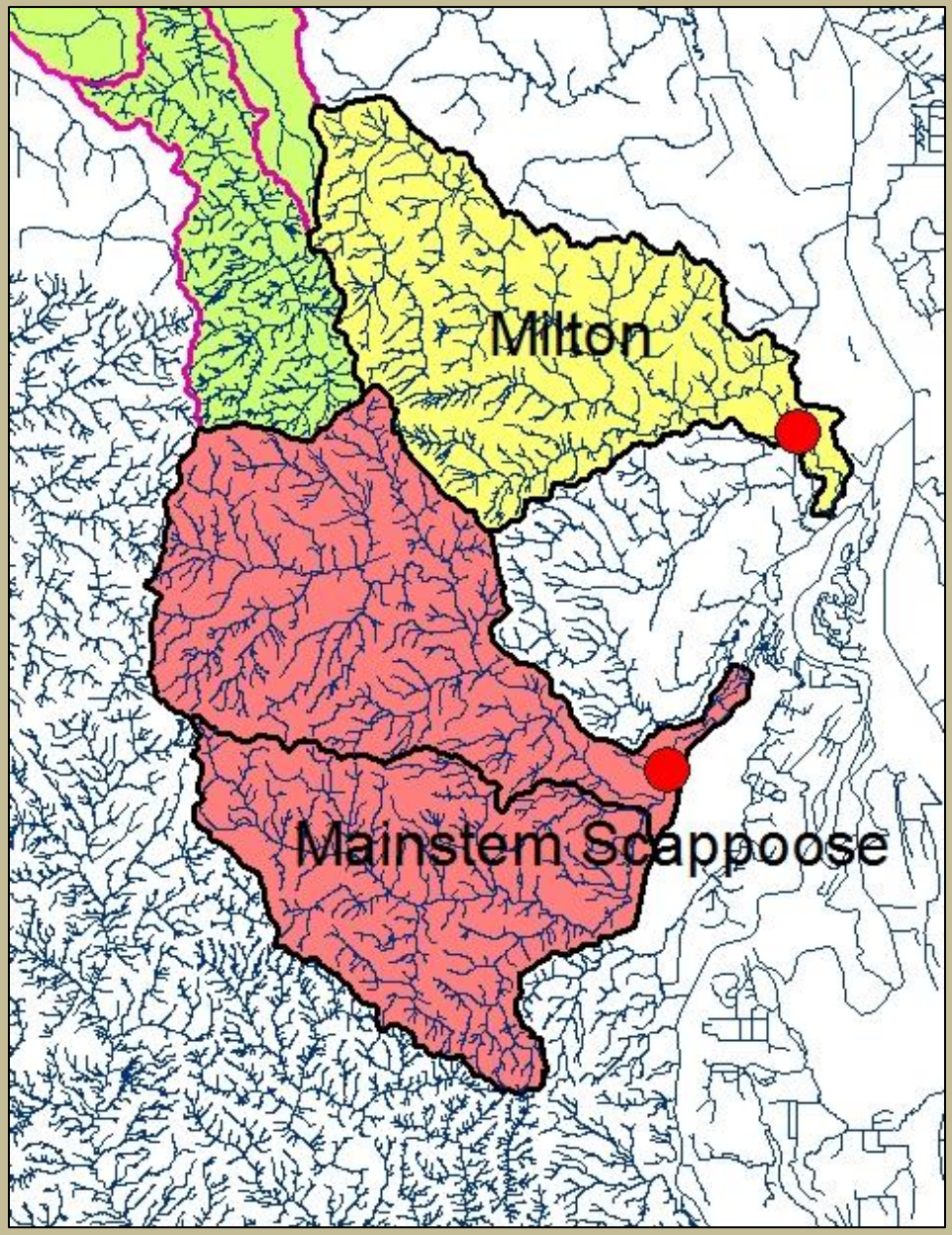
Reintroduction: outplanting strategies

- Location of release
- Timing of release
- Stage (egg, fry, adult) to be released
  - Potential differences in survival or renaturalization depending on stage used
  - Multiple strategies under consideration
- Conducted in adaptive management framework
- Requires identifying key parameters in habitat use, life history, and stream characteristics

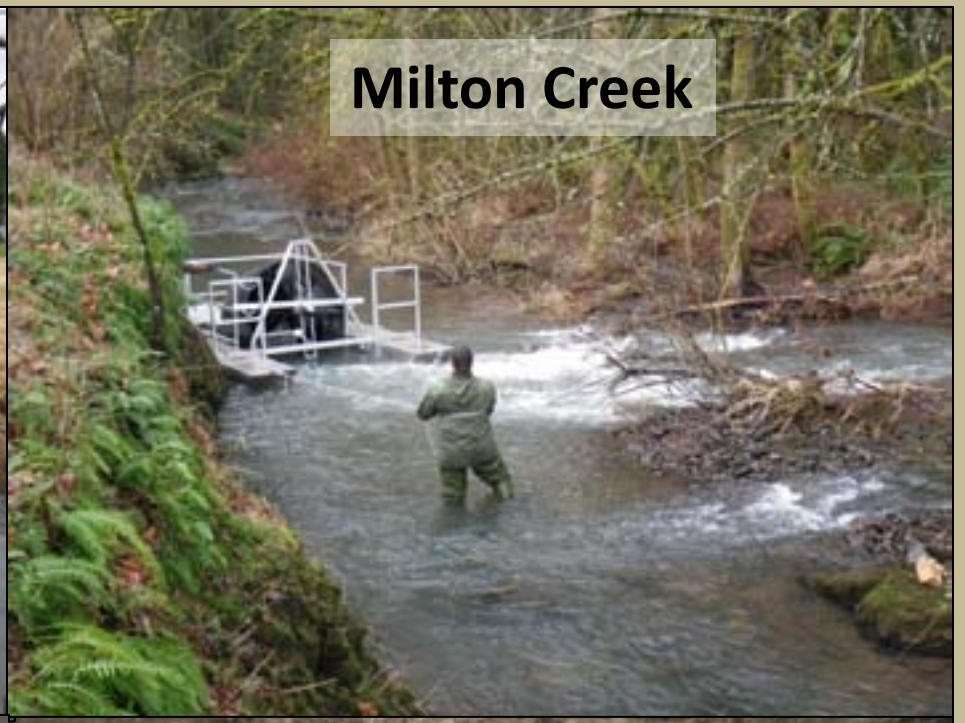
Baseline data: distribution and abundance of fry



Traps fished 7 days/week




Conyer's Creek


Milton Creek


Clatskanie River


Scappoose Creek

Baseline data: availability and quality of spawning habitat

- Develop spawning habitat sampling protocol for chum
  - Sample for groundwater
  - Record temperature and water quality metrics
  - Integrate with habitat surveys conducted by ODFW habitat crews
- Develop statistical models to describe high quality spawning habitat

Baseline data: adult traps and spawning surveys

- Identify distribution, abundance, life-history traits, and genetic variation of adults
- Identify distribution and abundance of potential spawn sites

Baseline data: estuary use

- Identify stream-of-origin for chum captured in estuary
- Evaluate use of estuary and tidal portions of tributaries
  - Residence time in estuary
  - Travel time from redd to estuary
  - Specific habitat use

Questions

Contact Kris Homel kristen.m.homel@state.or.us with questions or to get involved in the chum project

Photo by WDFW