Chehalis River Fish Use - Preliminary Results

Chehalis Basin Strategy
“Reducing Flood Damage and Enhancing Aquatic Species”
Technical Workshop
October 30-31, 2013
Presentation Outline

• Fish species in the basin
• Data gaps relative to dam assessment and ASEP
• Fish and habitat studies to fill data gaps
• Information collected to date
• Next steps
Fish species in the Chehalis Basin

- Diverse fish fauna
- 27 native species (1 endemic)
- 14 exotic species
- Range of habitats for spawning and rearing
- Glacial refugia

Wydoski & Whitney 2003, McPhail & Lindsey 1986
Fish species in the Chehalis Basin

- Limited information on fish distribution, especially around and upstream of proposed dam site.
- Chehalis River upstream of Pe Ell is important habitat for salmon and steelhead.
- Upper basin is being re-colonized following large flood events.

WDFW databases, Weyerhaeuser, UW Burke Museum, OSU Ichthyology Collection
“One major impediment to assess the fish distribution and habitat conditions in these two WRIAs is the tremendous lack of detailed field information... Without proper assessment of fish presence and abundance, it will be difficult to accurately use fish data to define impacts and recovery success and to monitor projects and recovery progress.” Executive Summary
Presentation Outline

• Fish species in the basin
• Data gaps relative to dam assessment and ASEP
• Fish and habitat studies to fill data gaps
• Information collected to date
• Fish species in the basin
Data Gaps Relative to Dam Assessment

• What will be lost in impoundment area?
• What will change in river below dam?
• What will the impact be to fish spawning and rearing above impoundment?
• What kind of fish passage allowances are needed?
• How would changes in river temperature affect fish?
Data Gaps Relative to ASEP

• Limiting habitat factors
• Ecosystem-based framework to assess dam impacts
• Habitat actions to address limiting factors
• Potential effects of alternative flood control actions on status of fish and habitat
• Climate change exacerbation of existing stressors on fish populations
Presentation Outline

• Fish species in the basin
• Data gaps relative to dam assessment and ASEP
• Fish and habitat studies to fill data gaps
• Information collected to date
• Fish species in the basin
Criteria to select fish and habitat studies

- **When?**
  - Fish ecology
  - River hydrology

- **Where?**
  - Dam impact areas
  - Reference areas

- **What?**
  - All fish species
  - Select habitat measures

**Rain Dominant Hydrology**

- Mean Monthly Flow (cfs)

Data source: USGS 12020000 (Doty gage)
Fish and habitat studies

- Adult spawners
- Smolt abundance
- Riverscape fish & habitat
- Reach scale fish & habitat
- Fish movements (summer & winter)

Area above dam site
Area above Skookumchuk
ADULT SPAWNER SURVEYS

What is adult fish abundance, timing, and distribution?

- August - June
- Upper Chehalis sub-basin
- Survey every 7-10 days, entire anadromous zone
- Spawner counts, timing, location, age composition
- Chinook (spring & fall), Coho, Steelhead
- WDFW Lead
SMOLT TRAP
What is outmigrant fish abundance, timing, and diversity?

- Winter/Spring
- Upper Chehalis sub-basin
- Smolt trap
- Counts, count expansions, migration timing
- All species moving downstream including salmonid smolts
- Chehalis Tribe Lead

Chehalis River smolt trap is operated near river mile 108 (Picture is not Chehalis).
RIVERSCAPE SURVEYS
Where does summer rearing occur for what species?

- Summer
- Chehalis mainstem (77 km)
- Snorkel (fish) & foot (habitat) surveys
- Continuous fish & habitat data
- Include species observable using snorkel methods
- WDFW Lead

Downstream snorkel surveys on the Chehalis River
REACH SURVEYS
Which habitats are associated with which fish species?

- Summer
- Discrete reaches in three focal areas (Upper Chehalis, Chehalis mainstem, Newaukum)
- Snorkel, electrofish, seine
- Habitat metrics
- All fish species
- WDFW Lead

Seine collections of fish in the Chehalis River
FISH MOVEMENTS (SUMMER)
Importance of cool water refugia for summer rearing

• River mile 98 to 108
• Juveniles tagged and released
• PIT tags & arrays*
• Movement into areas with cool water inputs
• Chinook, Coho, Steelhead
• WDFW Lead

*Passive Integrated Transponder (PIT)
FISH MOVEMENTS (WINTER)
Importance of mainstem for winter rearing

- Two tagging periods – Sept/Oct and Mar/Apr
- Three release areas
- Juvenile fish tagged and released
- Radiotags & fixed receivers
- Chinook, Coho, Steelhead
- USGS Lead

Map of Chehalis watershed showing locations of radio telemetry receivers
Presentation Outline

• Fish species in the basin
• Data gaps relative to dam assessment and ASEP
• Fish and habitat studies to fill data gaps
• Information collected to date
• Fish species in the basin
Fish-Habitat Studies During Summer Rearing Period

• Riverscape surveys
• Reach scale surveys
• Summer movements

Data collection period July 15 – October 25, 2013
Riverscape View: Patterns of Fish and their Habitat

Scale of data collection is 200 m reach
Fish counts by snorkelers
Habitat characteristics by foot

John Winkowski, WDFW
Mara Zimmerman, WDFW
Riverscape Survey Area

Map by Andrew Weiss, WDFW
River Habitat Summary

- Channel type
- Substrate
- Channel width
- Depth
- Pool counts
- Vegetation
River Habitat Summary

Bedrock

Proportion of reaches/km

Survey kilometer

Upstream

Downstream

10/31/2013
River Habitat Summary

Bedrock

Gravel

Boulder

Sand

Cobble

Silt
Summer Fish Distribution

- Counts by species and life stage
- Limited to pelagic species

Photo by Pete Caster, The Chronicle
Summer Fish Distribution

Salmon 0+

Survey Kilometer

Count
Summer Fish Distribution

Salmon 0+

Pikeminnow

Smallmouth Bass

Trout 0+

Redside Shiner

Bluegill

Trout 1+

Dace

Survey Kilometer

Survey Kilometer
Improved Understanding from Riverscape Study

- Continuous measure of fish and habitat above, within, and below impoundment area.
- Other aquatic species (amphibians, mussels).
- Synthesis: General distribution and habitat characteristics to predict fish occupancy and relative abundance.

10/31/2013
Reach Scale View: Fish Use of Habitat Units

Scale of data collection is habitat unit
Fish densities and biological (snorkel, electrofish, seine)
Habitat metrics

John Winkowski, WDFW
Mara Zimmerman, WDFW
Reach Survey Sites
Reach Scale Results

USGS 12020000 CHEHALIS RIVER NEAR DOTY, WA

--- Provisional Data Subject to Revision ---
Disconnected Off Channel Habitats

Three-spine stickleback
Largescale sucker
Olympic mudminnow
Northern pikeminnow
Sculpin sp.
Brown bullhead
Yellow perch
Sunfish sp. YOY
Largemouth bass
Bull frog
Improved Understanding from Reach Scale Surveys

• 2013 – Fish use of disconnected off-channel areas

**********

• How does occupancy differ among habitat units?
• How are relative densities correlated with habitat unit characteristics?
Summer Movement of Juvenile Salmonids

*Juveniles tagged in mainstem*
*Mainstem and tributary detection arrays*
*Mainstem and tributary temperature loggers*

John Winkowski, WDFW
Mara Zimmerman, WDFW
PIT Arrays Detect Tagged Fish

Mainstem PIT Antenna Array near potential dam site

Rock Creek PIT Antenna Array
Locations of PIT Arrays

Total fish tagged
Coho = 1614
Steelhead = 232

Coho = 670
Steelhead = 60

Coho = 405
Steelhead = 28

Coho = 539
Steelhead = 144
Improved Understanding from Summer Movement Study

- Do fish move upstream through the dam site during summer months?
  
  **Summer fish movement observed upstream and downstream through the dam site**

- How much movement occurs during summer low flow period?
- Is movement correlated with river temperature?
Presentation Outline

- Fish species in the basin
- Data gaps relative to dam assessment and ASEP
- Fish and habitat studies to fill data gaps
- Information collected to date
- Next steps
What do we know about fish in the Chehalis River?

Chehalis River Study Areas / Subbasins

Map by Andrew Weiss, WDFW
Next Steps

• Improve understanding of fish distribution and fish-habitat interactions in the basin.

• Use of information for Dam Assessment/ASEP will require selection of an output format.