

DRAFT: Biological and Implementation Indicators (June 10, 2008)

Indicator	Description
<b>BIOLOGICAL INDICATORS</b>	
<b>Total Abundance</b>	
Total adult salmon and steelhead returns to the Columbia.	Number passing Bonneville Dam (1938-present)
Abundance of adult fish in the Council's program.	Number of salmon, steelhead, lamprey, resident fish, ...
<b>ESUs</b>	
Trends in abundance and productivity for each ESU, especially listed ESUs.	Based on NOAA definitions
<b>Life-cycle mortality</b>	
Life stage survival estimates for representative populations of Chinook and steelhead.	Mortality rates at each life stage: egg to smolt, freshwater passage (reservoirs, dams), estuary, ocean, harvest, freshwater return. Include SARs.
<b>Harvest and Hatcheries</b>	
Harvest number and rate.	Totals for all spring, summer, fall Chinook, sockeye, steelhead, lower river sturgeon and for each listed ESU
Harvest of hatchery fish in the Council's Program	Number by species and by hatchery
Relative fitness of supplemented stocks from hatcheries in the Council's Program.	Possible measures may include relative reproductive success (RSS), percent natural influence (PNI), or natural origin spawners compared to control stream.
<b>Hydro survival</b>	
Survival rates through the hydrosystem for adult and juvenile fish passing in-river and barged.	From LGR to Bonneville and McNary to Bonneville
<b>Habitat</b>	
Productivity of wild fish in select watersheds targeted by Council program.	Juveniles/spawner for anadromous and resident fish. Alternatives for consideration: number of wild spawners or juvenile growth rates.
<b>Wildlife</b>	
Wildlife habitat units by dam: lost and acquired	Measured in habitat units.

## IMPLEMENTATION INDICATORS

### Passage Barriers

Additional habitat made accessible	Miles, number of barriers removed. (PISCES: Install Fish Passage Structure, Remove/Install Diversion, Remove/Modify Dam,...)
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### Water

Additional water available for fish, anadromous and resident	Cfs, miles of primary stream reach improvement. (PISCES: Acquire Water Instream, Install Well, Install Pipeline, Install Sprinkler...)
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### Land

Additional land acquired or leased for fish habitat	Miles protected, # of acres. (PISCES: Lease land, ...)
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### Improvement

Riparian habitat improved	Miles, acres. (PISCES: Increase Instream Habitat Complexity, Realign, Connect, and/or Create Channel, Create, Restore, and/or Enhance Wetland, Enhance Floodplain, Install Fence, Plant Vegetation, Practice No-till & Conservation Tillage Systems, Upland Erosion & Sedimentation Control...)
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### Screens

Diversion screens installed.	Number and total flow protected. (PISCES: Install Fish Screen)
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### Predators

Number of juvenile salmon saved from all predators.	Consider pikeminnow, avian predators, sea lions, ....
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### Watershed Health Indicator

Number and percentage of targeted watersheds that provide adequate fish habitat.	Need to develop watershed health indicator for fish.
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