

## **The Columbia River Treaty: A Definition of Ecosystem Function**

The Columbia River and its major tributaries have been fundamentally transformed to provide for the settlement and development of the Pacific Northwest. Where once free-flowing rivers produced the most bountiful salmon runs on earth, today dams and reservoirs alter flow, impair water quality and block access to historic salmon spawning grounds. The result is the extinction and near-extinction of many populations of fish. Clean water and abundant salmon are the legacy of the Columbia River and its tributaries. It is this legacy we seek to reestablish for future generations by making Ecosystem Function a co-equal purpose of the Columbia River Treaty.

Healthy river ecosystems exhibit the following characteristics:

- Flows that mimic historical seasonal flow patterns.
- Floodplains that absorb high flows.
- A variety of habitat types (pools, riffles, runs, eddies, side channels).
- Diversity of native fish and wildlife adapted to varying flow conditions.
- Healthy watersheds.
- Native trees, plants, shrubs and grasses in the riparian corridor.
- Water quality necessary to support watershed food webs
- Durable support for sustainable economies and communities.

Thus, a healthy Columbia River and its tributaries would:

- Exhibit more natural flow patterns.
- Transport sediment and substrate to create habitat quality and connectivity through the development of pools, riffles, rapids, runs, side channels and eddies.
- Safely absorb high flow events in restored and reconnected floodplains.
- Have temperature and flow conditions allowing native aquatic species to thrive while decreasing conditions favorable to non-native species.
- Have cooler temperatures than the current, altered temperature regime.
- Allow fish to migrate to historic habitats for use by ecosystems and people.
- Build resilience to climate change and capture large amounts of carbon.
- Have a healthy estuary that provides refuge and a gradual transition from fresh to saltwater for sea-run fish
- Headwaters and tributaries that provide coldwater refuge for native fish communities

Strategies to improve the ecosystem of the Columbia and its tributaries:

- Restore natural flow patterns through changes in dam and reservoir operations or dam removal to increase spring and early summer flows in order to decrease the travel time of juvenile salmonids migrating to the ocean.
- Construct fish passage at dams lacking passage and improve passage for Pacific Lamprey.
- Reconnect and restore floodplains in order to provide natural flood storage and habitat for fish and wildlife.
- Reduce river temperatures in summer, particularly in low flow years.
- Increase oxygen levels in the estuary produced by higher spring and summer flows.
- Maintain higher and more stable reservoir elevations.
- Decrease changes in river elevation to prevent the dewatering of redds and stranding of juvenile salmon.