

# KPFHP DRAFT CAP PLAN

## DRAFT FRESHWATER TARGETS - WHAT WE WANT TO CONSERVE

### Target #1: Steep coastal streams

**Focal Target Description:** Includes non-glacial high gradient streams and tributaries that flow directly into the ocean. Includes all instream and riparian habitat and associated wetlands. In general, these are relatively short (< 20 km), high gradient (>5%) watersheds that drain coastal mountains. These streams usually have a short low-gradient reach near tidewater that provides suitable spawning habitat for pink and chum salmon, and some streams have a short reach with gradients less than 3% that provides suitable spawning and rearing habitat for small populations of coho salmon. Although individual streams support small populations of salmon, collectively these coastal streams produce sizeable runs of pink, chum, and coho salmon. Hydrographs usually peak in spring and early summer with peaks in snowmelt run-off, but can also experience peaks during freshets associated with rainfall events, typically in the fall. Water temperatures in these streams are likely resilient to changes in air temperature.

**Examples** include Rocky River, Humpy Creek, Jakalof Creek, Seldovia River, Granite Creek, and other streams on the outer coast of the Kenai Peninsula.

**Nested Target # 1:** Pink & Chum salmon spawning

**Nested Target # 2:** Coho salmon rearing

### Target #2: Non-glacial mountain rivers

**Focal Target Description:** Includes non-glacial rivers and tributary streams that drain mountainous terrain. Includes all instream and riparian habitat and associated wetlands. Some shorter (< 20 km) mountain streams and rivers become tributaries of larger glacial rivers and some longer (> 20 km) rivers flow directly into the ocean. These streams and rivers follow typical dendritic morphology with small high gradient tributary streams joining to form larger streams and rivers that gradually increase in size and decrease in gradient over their course. These rivers and streams typically provide spawning and rearing habitat for chinook and coho salmon. Hydrographs usually peak in spring and early summer with peaks in snowmelt run-off, but can also experience peaks during freshets associated with rainfall events, typically in the fall. Water temperatures in these streams and rivers are likely resilient to changes in air temperature.

**Examples** include the Chuit River, Sixmile Creek, Quartz Creek, Resurrection Creek, Ptarmigan Creek, Juneau Creek.

**Nested Target # 1:** Coho and Chinook salmon all life stages

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## Target #3: Glacial rivers without lakes

**Focal Target Description:** Includes glacial rivers and streams that are not associated with lakes. Includes all instream and riparian habitat and adjacent wetlands. These streams and rivers follow typical drainage basin morphology with small high gradient tributary streams joining to form larger streams and rivers that gradually increase in size and decrease in gradient over their course. These systems typically provide spawning and rearing habitat for sockeye and coho salmon, although individual spawning populations are generally small. Estuaries and sloughs are extremely important for fish production because of the general lack of good quality rearing habitat and fish in many of these systems likely complete some of their freshwater rearing in estuaries. These streams are fed by glacial melt and have hydrographs that peak during the summer. Water temperatures in these streams and rivers are likely resilient to changes in air temperature.

**Examples** include Fox River, Placer River, Sheep Creek, Battle Creek.

**Nested Target # 1:** Chinook, Sockeye and coho salmon all life stages

**Nested Target # 2:** Hooligan

**Nested Target # 3:** Pink and chum in spawning life stage

## Target #4: Glacial rivers w/ lakes

**Focal Target Description:** Includes glacial rivers and streams that are associated with lakes. Includes all instream and riparian habitat and adjacent wetlands. These rivers provide spawning and rearing habitat for Chinook, coho, and sockeye salmon. These streams are fed by glacial melt and have hydrographs that peak during the summer. The large lakes associated with some of these rivers (Kenai Lake, Skilak Lake, Tustumena Lake) act as buffers to rapid changes in streamflow and changes in temperatures. Water temperatures in these streams and rivers are likely resilient to changes in air temperature.

**Examples** include Kenai River, Kasilof River, Crescent River (west side Cook Inlet), Bradley River.

**Nested Target # 1:** Sockeye, Chinook, coho salmon all life stages

**Nested Target # 2:** Rainbow trout/steelhead

**Nested Target # 3:** Lake trout

**Nested Target # 4:** Hooligan

**Nested Target # 5:** Dolly Varden

## Target #5: Lowland groundwater/wetland-dominated systems

**Focal Target Description:** Includes most lowland streams and rivers that are primarily influenced by complex wetland and groundwater interactions. Includes all instream and riparian habitat and associated wetlands. These streams and rivers provide spawning and rearing habitat for most salmonid species. Hydrographs usually peak in spring and early summer with peaks in snowmelt run-off, but can also experience peaks during freshets associated with rainfall events, typically in the

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fall. Water temperatures in these streams are closely linked to increases in air temperature.

**Examples** include Anchor River, Chickaloon River, Swanson River, Deep Creek, Ninilchik River, Stariski Creek.

**Nested Target # 1:** Chinook and coho salmon all life stages

**Nested Target # 2:** Dolly Varden

**Nested Target # 3:** Rainbow trout/Steelhead

## Target #6: Closed-basin lakes

**Focal Target Description:** Includes all closed-basin lakes, ponds, and open-water wetlands, most of which occur in the Kenai Peninsula lowlands. Includes all in-lake and shoreline habitat and short connective stream segments. Water levels in these lakes and ponds are primarily influenced by complex wetland and groundwater interactions. These small lakes and ponds provide habitat for numerous endemic fish species including Arctic char, rainbow trout, longnose sucker, and stickleback. Water temperatures in these lakes are closely linked to changes in air temperature.

**Examples** include lakes in the Swanson and Swan River canoe systems and many named and un-named lakes on the northern Kenai Peninsula lowlands.

**Nested Target # 1:** Arctic char

**Nested Target # 2:** Suckers, stickleback

**Nested Target # 3:** Endemic populations/assemblage

## Target #7: Clearwater connected lakes with associated streams

**Focal Target Description:** Includes clearwater lakes that are part of a larger watershed that ultimately drains to the ocean. Lakes are a primary hydrologic influence- if lakes were missing, the system would be very different. Includes all in-lake and shoreline habitat and short connective stream segments. Water levels in these lakes and ponds are primarily influenced by annual snowmelt. These lakes provide spawning and rearing habitat for sockeye salmon and lake trout, and provide rearing habitat for coho salmon. Water temperatures in these systems are closely linked to changes in air temperature.

**Examples** include Hidden Lake/Creek, Fuller Lakes, Juneau Lake, Crescent Lake, Fox Creek, Chenik Creek, upper and lower Russian River lakes.

**Nested Target # 1:** Chinook and Sockeye salmon all life stages

**Nested Target # 2:** Coho salmon rearing and spawning

**Nested Target # 3:** Lake trout

**Nested Target # 4:** Dolly Varden

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**FRESHWATER TARGET VIABILITY TABLE**

Conservation Targets		Landscape Context	Condition	Size	Viability Rank
	Current Rating				
1	Steep coastal streams	Very Good	Good	Good	Good
2	Non-glacial mountain rivers	Very Good	Good	Good	Good
3	Glacial rivers w/o lakes	Very Good	Very Good	Good	Very Good
4	Glacial rivers w/ lakes	Good	Good	Good	Good
5	Lowland groundwater/wetland-dominated systems	Fair	Fair	Good	Fair
6	Closed-basin lakes	Good	Good	Good	Good
7	Clearwater connected lakes with associated streams	Very Good	Good	Good	Good
Project Health Rank					Good

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## FRESHWATER POTENTIAL THREATS RANKING TABLE

Potential Threats Across Targets		Steep coastal streams	Non-glacial mountain rivers	Glacial rivers w/o lakes	Glacial rivers w/ lakes	Lowland groundwater/wetland-dominated systems	Closed-basin lakes	Clearwater connected lakes with associated streams	Overall Threat Rank
Project-specific threats		1	2	3	4	5	6	7	
1	Injurious aquatic invasive species				Low	High	High	High	High
2	Warmer climate		Medium		Low	Medium	Medium	Medium	Medium
3	Incompatible road development		Low	Medium	Low	Medium		Low	Medium
4	Residential development in riparian zone				Medium	Medium			Medium
5	Hydro development	Low	Medium	Low	Low			Low	Low
6	Incompatible mining	Low	Low			Medium			Low
7	Catastrophic spill (vehicle, tank farm, pipeline)				Low	Medium			Low
8	Urbanization/development outside the riparian zone				Low	Medium			Low
9	Incompatible ORV use					Medium			Low
Threat Status for Targets and Project		Low	Medium	Low	Medium	High	Medium	Medium	Medium

- Many others noted, with a low rank.

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## Potential Threats to our Partnership's Geography

All of the conservation targets are potentially impacted by multiple threats, which act together to alter their viability. Based on the information from surveys, monitoring and personal observations over the past several decades, the freshwater science team members collectively ranked the highest critical threats as:

1. Injurious invasive aquatic species (present and potential species)
2. Warmer climate
3. Incompatible road development
4. Residential development in riparian zones

These four potential threats have direct impacts for all freshwater system targets of the Kenai Peninsula Partnership.

At a local scale, many other impacts exist that can affect important aquatic habitats. One example is historic mining and hydro-development that significantly altered Cooper Creek. In that particular drainage, restoring habitat based on historic activities would be a high priority for our US Forest Service partner as they are the land manager for that creek and the partnership would be supportive of their efforts. Other similar examples exist; however, our task to identify and prioritize potential threats is at a larger landscape scale, focusing on impacts across our entire partnership geography.

## Injurious Invasive Aquatic Species Strategies

**Objective:** Novel species of invasive flora and fauna that are injurious to native fish or their habitats will not be allowed to establish within the Kenai Peninsula Borough. Existing populations of Northern Pike, Reed Canary Grass and Elodea will be contained to the host watershed(s) and efforts to eradicate within sub-watershed boundaries will only be supported where a high probability of success exists.

**Target(s):** Three targets are at higher threat levels; Lowland groundwater/ wetland dominated systems; Closed basin Lakes; Clearwater connected lakes with associated streams

**Key Attributes:** Migratory pathways, food web dynamics, vegetation structure and complexity

**Key Threats:** Lowland groundwater/ wetland streams – Habitat connectivity, Nutrient dynamics; Closed Basin Lakes – Nutrient dynamics, spawning habitat; clearwater connected lakes and associated streams – Nutrient dynamics, spawning habitat, habitat fragmentation.

**Overarching Approach** – Watersheds without invasives remain free of invasives. Support mechanisms to rapidly respond to first detections of novel invasive species. Contain existing invasive species within the smallest watershed boundary practical while seeking to eradicate populations within the smallest watershed boundaries. Work with partners and the larger community to prevent the introduction of novel species and the reintroduction of eradicated species into the Kenai Peninsula Borough.

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## Warmer Climate Strategies

**Objective:** Maintain current cold-water temperatures and prevent increases in stressful water temperatures above the inevitable warming due to a changing climate.

**Target:** Lowland groundwater/wetland-dominated systems; Clearwater connected lakes with associated streams

**Nested Targets:** All cold-water fish species

**Key Attribute:** Water Temperature

**Key Potential Threat(s):** Loss of shade and groundwater connections; increase in water withdrawals

**Overarching Approach** – In response to the inevitability of some degree of regional warming, we need to improve watershed resilience to thermal change. As we gain more understanding of current stream temperature profiles and can assess which streams are most vulnerable to the impacts of climate change, we will implement conservation and protection measures to help keep cold water cold and reduce additional stressors to freshwater systems that are warm and will get warmer.

## Incompatible Road Development Strategies

**Objective:** No new roads on the Kenai Peninsula will impede juvenile salmon movement. Existing barriers created by roads will continue to be restored for full aquatic organism movement and will be evaluated for sources of excessive sediment and mitigated for where necessary

**Target:** Glacial rivers without lakes, lowland groundwater/wetland-dominated systems

**Nested Targets:** All migratory fish species in their native assemblage

**Key Attribute:** Migratory corridors, water quality (sediment)

**Key Potential Threat(s):** Fragmentation, excessive sediment input

**Overarching Approach** Protection of habitat fragmentation for intact waterways will ensure the vast majority of our systems will support access to diverse aquatic habitats necessary to support all life cycles of migratory fish. The majority of low cost exiting barriers have been restored; the remaining known barriers should continue to be corrected with an emphasis on the more difficult barriers on our two major highways. Road crossings of waterways are also a prime source of sediment and more attention needs to be focused here.

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## Residential Development in riparian area strategies

**Objective:** Protect and maintain ecological integrity of existing riparian zone and restore degraded areas

**Target:** Glacial rivers with lakes, lowland groundwater/wetland-dominated systems

**Nested Targets:** Chinook, Sockeye and Coho all life stages, Hooligan, Rainbow Trout, Steelhead, Lake Trout, Dolly Varden

**Key Attribute:** Connectivity to off channel habitat, groundwater and wetland flow connections, timing and magnitude of adjacent surface water delivery, water quality (nutrient dynamics and toxic contaminate filtering), water temperature

**Key Potential Threat(s):** loss of direct surface water aquatic habitat connectivity to adjacent wetlands and other off channel habitat, loss or disruption of groundwater patterns, loss of primary nutrient input (grass, leaves, insects, etc.), increases in impervious surfaces.

**Overarching Approach:** Increasing residential pressures for waterfront development should be minimized and managed.