Carkeek Watershed Community Action Project, 501 (c)(3)
386 NW 112th, Seattle· WA 98177, 206-363-4116
Rick Henry, Vice President
on behalf of Nancy R. Malmgren, Director

CWCAP General Project Study Plan for WDFW SCP

PROJECT TITLE:

CWCAP Science, Education, Demonstration, and Outreach Programs

PROJECT DESCRIPTION:

CWCAP is requesting a Scientific Collection Permit (SCP) Renewal in order continue the following related projects:

- Collect salmon spawning data from the annual fall salmon return in the King County Piper's Creek System.
- Annually release imprinted chum salmon fry stock from the Suquamish Tribe's Grovers Creek Salmon Hatchery.
- Sample freshwater aquatic invertebrates for identification and discussion in salmon life cycle and water quality education, demonstrations, and outreach programs.

Goals and objectives include:

Science
- Provide agencies such as Seattle Public Utilities, Department of Fish & Wildlife, King County, Department of Ecology with useful information regarding adult salmon return numbers, salmon spawning success, and supplemental stocking statistics
- Improve data collection methodologies in order to increase the value of information provided agencies
- Evaluate, consult, and recommend projects, improvements, and other activities to improve the health and safety of the Piper's Creek/Carkeek Park Watershed system

Education
- Provide education, demonstration, and outreach opportunities to Carkeek Park visitors, private and public school educators, higher education, local agencies, and other interested community members
- Improve outdoor park access for under-served communities to participate in salmon and watershed awareness programs
- Provide project opportunities for local higher education students seeking to fulfill coursework, project, and service hour requirements in fisheries, water quality, watershed, and wetland resources

Demonstration
- Engage park visitors, schools, agencies, businesses, and other community groups by providing hands-on daily salmon feeding activities during each February-May salmon imprinting season
- Engage park visitors, schools, agencies, businesses, and other community groups by providing salmon viewing activities, watershed and water quality demonstrations, and discussion

Outreach
- Attract energetic and knowledgeable individuals to participate in existing and emerging educational, demonstration, and outreach programs; expand volunteer opportunities
- Expand partnerships with local agencies, schools, businesses, and community groups to provide improving education, demonstration, and outreach programs in the Piper's Creek/Carkeek Park system

METHODOLOGIES:

Project Study Plan for Adult Salmon Return Data Collection

CWCAP is requesting a Scientific Collection Permit (SCP) Renewal to collect data from deceased Chum (Oncorhynchus keta) and Coho (Oncorhynchus kisutch) salmon in Piper's Creek (08.0020) and its tributaries, Venema Creek (08.0021) and Mohlendorph Creek (08.0022), between October and January, within the permit period.

CWCAP volunteers will collect and record the following salmon data:

- Measure/re-measure distances in 100 foot increments from the mouth of King County Piper's Creek at the railroad overpass culvert (divides Carkeek Beach on the west side and Carkeek Wetland on the east side) east to the King County Pump-CSO Station. Measure/re-measure distances in 100 foot increments from the mouth of the Venema Creek tributary where it merges into Piper's Creek north to the imprint pipe located approximately 200 feet upstream from the Les Malmgren Imprint Pond. Mark each 100 foot increment with a temporary tie-on pink flag tied to an easily accessible creek-side branch from a woody tree/shrub.
- Temporary distance markers are used to record the relative location of deceased salmon, redds, and other related collection data elements.
- Record water and air temperature.
- Record location of dead adult salmon relative to their distance in feet from the mouth of Piper's Creek.
- Record the presence or absence of adipose fin.
- Record relative number of days since death and state of deterioration.
- Measure and record length and height of each fish.
- Extract scale samples from a subset of total fish sampled. Place scales and collection data in scale sampling field book.
- Make a ventral incision from the vent to the throat to expose the abdominal cavity.
- Record sex (M/F/Unk) and relative spawning success (Full/Partial/None/Unkn).
- Return fish to the location of initial collection.
- Visual data for live salmon/trout will be recorded as to location relative to their distance in feet from the mouth of Piper's Creek and the type of creek habitat. Sex is determined visually, if possible.

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Project Study Plan for Eyed Chum Salmon Egg Rearing and Self-Release Project

CWCAP is requesting an SCP Renewal to continue rearing eyed Chum salmon eggs (*Oncorhynchus keta*) to fry stage for release into Venema Creek (08.0021) primarily between January and May, within permit periods.

Approximately 20,000 eyed Chum salmon eggs are donated by the Suquamish Tribe's Grovers Creek Salmon Hatchery.

Eggs will be reared in a 3-tiered, self-releasing **55** gallon Egg Incubator/Self-release tank off-channel within the Imprint Pond Compound on Venema Creek.

Another **5** gallon Egg Incubator/Self-release tank off-channel within the Imprint Pond Compound is also available for use in addition to the 55 gallon tank.

Fry will self-release into Venema Creek via the outflow pipe near the surface of the Egg Incubator/Self-release tank. Techniques have been developed with guidance from staff from the Suquamish Tribe's Grovers Creek Salmon Hatchery.

CWCAP volunteers will facilitate the following salmon rearing activities:

- 20,000 eyed Chum salmon eggs are donated by the Suquamish Tribe's Grovers Creek Salmon Hatchery and distributed evenly onto 3 egg incubation trays.
- Egg incubation trays are submerged and stacked into a 55 gallon in-ground Egg Incubator Tank that is in-line with existing intake pipe, drain pipe, drain valve, and self-release overflow pipe.
- Water flow will be regulated with existing valves to establish recommended flow rates.
- Water and air temperature, flow rates, dissolved oxygen, pH and other parameters will be monitored and recorded.
- Emergent fry will self-release directly to Venema Creek.
- Initial egg count, mortality and release numbers are recorded.

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Project Study Plan for Salmon Fry Imprinting and Release Project

CWCAP is requesting an SCP Renewal to continue imprinting fed Chum salmon fry (*Oncorhynchus keta*) for release into Venema Creek (08.0021) primarily between January and May, within permit periods.

Two batches of approximately 30-35,000 fed Chum salmon fry (approx. 70,000 total) are donated by the Suquamish Tribe's Grovers Creek Salmon Hatchery. Fry are fed by volunteers in the 900 gallon Imprint Pond off-channel within the Imprint Pond Compound on Venema Creek. Feedings 3 times per day, 7 days per week provide rapid growth of salmon fry and the opportunity for the park-visiting watershed community to interact with the 25 project volunteers. Each batch of fish is imprinted/fed for approximately 3-8 weeks before release, ensuring strong imprint and robust size.

Approximately 20-30 elementary schools in the Piper's Creek watershed community participate in the Salmon in the Schools (SIS) program. Each school in the program receives 150-250 chum salmon eyed-eggs donated by the Suquamish Tribe's Grovers Creek Salmon Hatchery

After school classrooms rear the salmon January – April, they are brought to the Les Malmgren Imprint Pond at Carkeek Park where they are added to the Imprint Pond for imprinting and release by CWCAP volunteers.

Salmon in the Schools fry are released into Venema Creek traditionally on the Saturday evening of the annual Earth Day Celebration at Carkeek Park.

CWCAP volunteers will facilitate the following salmon imprinting and release activities:

- 2 back-to-back batches of 30-35,000 fish each are delivered to the Imprint Pond and imprinted/fed for approximately 3-8 weeks each.
- Imprint Pond is in-line with existing intake pipe, sedimentation tanks, drain pipes, drain valves, outflow pipe, overflow pipe, and emergency bypass pipe and valve.
- 21-25 volunteers feed the fish with hatchery-provided fish food 3 times per day, 7 days per week, while recording data, performing routine maintenance, and engaging park visitors with salmon and watershed education.
- Data collection includes air/water temp, amount fed, water flow (GPM), pH, dO2, #mortalities, #visitors, remarks, #fish/lb, time in/out.
- After approximately 3-8 weeks of imprinting/feeding, the outflow pipe escape screen is removed, which exposes the drain at the bottom of the Imprint Pond. To avoid visual predators the salmon are released into Venema Creek at dusk.
- The Imprint Pond and Sedimentation Tanks are cleaned/disinfected between batch deliveries.
- Depending on delivery schedules and other variables, the approx. 5,000 Salmon in the Schools fish fry are either added to the 2nd batch of 30-35,000 salmon fry already in the Imprint Pond or a "3rd batch" is established from the SIS fish after the 2nd batch is released.
- After all fish are released, the Imprint Pond system is cleaned, disinfected, and shut down for the season.

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Project Study Plan for Aquatic Invertebrate Education Project

CWCAP is requesting an SCP Renewal to continue the development of the Aquatic Invertebrate Study Program. This CWCAP program educates Seattle Public Utilities Salmon Stewards, Salmon in the Schools program schools, Seattle Parks EarthKeepers Day Camp, participating public and private schools, and other participating organizations.

Participants:

- Learn freshwater stream sampling methods
- Safely collect stream samples
- Transfer samples to identification tables
- Sort and separate organic material from in-organic material
- Identify and enumerate aquatic insects, worms, and small arthropods
- Discuss water quality indicators
- Discuss improvement of stream and salmon health
- Collect in Piper's Creek (08.0020) and its tributaries, Venema Creek (08.0021) and Mohlendorph Creek (08.0022), primarily between January and August, within permit periods.

Aligning identification and enumeration techniques for aquatic invertebrates with other agencies may lead to better data and an expanded community involvement through our Aquatic Invertebrate Study Program. It is our intent to develop outcomes that will improve sustainable and expanding outreach through community volunteerism and agency partnerships.

CWCAP volunteers will collect and record the following invertebrate data:

- Record water and air temperature.
- Identify and record sampling sites on Piper's and Venema Creeks
- Characterizes and record aquatic invertebrate habitats.
- Use various hand nets, kick nets, and gloved hands to collect invertebrates.
- Transfer samples to trays for identification with magnifying glasses and field guides.
- Record common names of aquatic invertebrates (insects, worms, small arthropods).
- Relate collection results to stream health, salmon diet and adult invertebrate ecology
- Return invertebrates to the location of initial collection

PROJECT LOCATION:

- King County, Piper's Creek Watershed
- Carkeek Park, Carkeek Beach, Carkeek Wetlands
- Piper's Creek (08.0020) and its tributaries, Venema Creek (08.0021), Mohlendorph Creek (08.0022)
- Off-channel, gravity flow imprint pond takes water from Venema Creek through **intake pipe** located approximately 250 feet upstream from the confluence of Venema and Mohlendorph Creeks.
- Off-channel, gravity flow imprint pond returns water back into Venema Creek through **outflow pipe** located approximately 20 feet upstream from the confluence of Venema and Mohlendorph Creeks after passing through the Imprint Pond System, gravitationally.

FINAL DISPOSITION OF SPECIMENS:

- Adult, deceased chum/coho salmon collected for spawning survey are returned to the creek/bank location where they were initially collected immediately after measurements and ventral incision are completed
- Adult, deceased chum/coho salmon collected for use in dissection/anatomy demonstrations are returned to the creek/bank location near where they were initially collected immediately after demonstrations are completed
- Aquatic insects, worms, and small arthropods collected for use in macro invertebrate education classes are returned live to the creek/bank location near where they were initially collected immediately after demonstrations are completed
- Incidental mortalities associated with egg and fry rearing activities are counted and recorded before they are disposed of in Venema Creek next to the Les Malmgren Imprint Pond

STATEMENT OF QUALIFICATIONS OF PERMIT APPLICANT AND SUB-PERMITTEES:

Years of and description of experience with methodology
Each current sub-permitee listed has 3 or more years of hands-on experience with the use and development of all methodologies that have been used during all aspects of this project in the past 3-5 years.

Years of and description of experience with the species to be collected
Each current sub-permitee listed has 3 or more years of hands-on experience with the identification and handling of all species encountered during all aspects of this project.

Access to research and education facilities and proper equipment used in this project
Each current sub-permitee listed has 3 or more years of hands-on experience with all of the equipment, data, educational materials and educational, demonstration, and outreach goals and objectives of this project. Each current sub-permitee listed is involved year-round in the development and improvement of methods, equipment, and community and agency participation.

Competency to care for collected specimens
Each current sub-permitee listed has 3 or more years of hands-on experience with:

- the identification and handling of live and dead animals encountered, including the avoidance of active redds, post-spawning redds, spawning pairs, and predator/prey activity.
- the identification and handling of live aquatic insects, including the sampling, manipulation, return of live insects to their habitat.
- the handling of tens of thousands if live chum eggs and fry at every stage, from delivery to rearing to release.
- the stewardship required to education visitors, educators, and students on safe, healthy animal interactions