

## Kerrie Dykeman

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**From:** rleon@kdlp.ca  
**Sent:** October 23, 2019 11:19 AM  
**To:** Kerrie Dykeman  
**Subject:** Request for contact information

Good morning Kerrie

We, at Katzie Development Limited Partnership are submitting a proposal to Fish and Wildlife Compensation Program, and I would like to ask Councillor Mike Hayes for a letter of support. Mr. Hayes came to our sign unveiling and site exploration, and shared kind words, and interest in the restoration work we are doing along the Alouette River, and mentioned that the City of Pitt meadows will support us in future restoration efforts. Unfortunately, our submission is due in two days, but I would still like to ask Mr. Hayes for a letter of support.

Can you please provide me with his contact information?

Thank you Kerrie and have a great day.

Roma

**Roma Leon**

**Traditional Resource Specialist (TRS)**

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## Background

The Katzie people are the original inhabitants and stewards of the lands and waters of the Pitt and Alouette watersheds in the municipalities of Pitt Meadows and Maple Ridge. The Katzie successfully and sustainably managed salmon, eulachon, wapato (*Sagittaria latifolia*), many other culturally important species and the ecosystems that support them for thousands of years. In the past 160 years, 80% of wetland habitat in the Fraser River Basin has been lost to hydroelectric damming, dike construction for agriculture, and urban development (Boyle et al 1997). This has resulted in the extirpation or endangerment of several species from in Katzie territory, some of which are now federally-listed species at risk. The loss of wetland habitat has also resulted in massive declines populations of numerous species of cultural value to the Katzie. Consequently, cultural practices that supported sustainable use of these species for food and medicine have also declined. Wapato has been identified as a cultural keystone species for the Katzie First Nation, but one that is no longer accessible due to the loss of wetland habitat (Garibaldi and Turner 2004; Leon 2014).

The Katzie First Nation want to preserve and enhance culturally-valued plants of wetland riparian habitats to promote food sovereignty and cultural revitalization. To facilitate this, we have created an eco-cultural restoration plan for Katzie traditional territory, which integrates Katzie traditional knowledge and values with a science-based plan for restoring wetland and riparian habitat for the benefit of salmonids, priority species of conservation concern, and culturally-valued species (Table 1). The proposed project continues implementation of this plan.

This proposal builds on the four previous years of FWCP funded work that Katzie has completed in the Alouette watershed. In 2020 we will continue building capacity within Katzie projects for leadership in species and habitat conservation in Katzie traditional territory. The proposed project is focused on FWCP Priority 1 Actions 8, 12, 14, 20, 22, 23, and 26, and priority 2 and 3 actions 21, 23, 25 and 27 with the intended outcome to create and enhance habitat for the benefit of species of conservation concern and cultural value (FWCP 2017). The plan meets regional goals for species at risk, community values for ecosystem resilience, and Katzie values for cultural revitalization and sustainable use. The proposed project meets all three FWCP strategic objectives: conservation, sustainable use, and community engagement.

## Methods/Approach

The Katzie Ecocultural Restoration Plan uses an adaptive management approach: in which results of rigorous monitoring are used to inform changes or new directions in restoration and management approaches. In the first three years of our work we prop, we identified three low bench sites along the lower Alouette River that were more than 95% invaded by reed canary grass and other invasive plants. Two sites totalling 1.2 ha are located near Harris Road on the South Alouette River. The third site (5.5 ha) is located near Neaves Road on the North Alouette River and contains 2.0 ha of intact marsh. In 2016 we completed habitat enhancement at the two Harris Road sites. During 2017 and 2018, we completed enhancement work over 0.8 ha of the Neaves Road site. Enhancement actions encompassed recommended techniques and priority actions outlined in species management plans (Table 1 and 2). Work in 2017 at the Neaves site including a 3-m deep pond, with anchored submerged wood and floating logs and a shallow tidal marsh habitat. These enhancements were intended to create over-wintering off-channel habitat for coho salmon, chinook salmon and steelhead trout, and potentially habitat for recently released juvenile Western Painted Turtles and will benefit several other priority species (Table1). In 2018, we completed enhancement at the Neaves Road site by expanding and connecting the 2017 excavations to create 0.45 ha of marsh habitat. The marsh was planted with wapato, to provide an accessible garden for community harvesting of tubers as a traditional food.

We continued to implement an effectiveness monitoring program to evaluate restoration success by comparing vegetation, bird, and fish responses to habitat enhancement. We also collected inventory data to support targeted habitat enhancement efforts for three federally-listed species. In 2019, with funds from our federal climate change grant, we expanded our effectiveness monitoring program to include additional fish inventory and water quality monitoring, provide baseline data on seasonal differences in fish distribution in the Alouette River. Acoustic monitoring of bats at the Neaves restoration site and reference sites has also been started.

In 2019 we applied the species data we collected in previous years to implement habitat enhancement and management actions that meet local and regional priorities: 1. installation of snags where 2018 surveys showed great blue herons foraging, 2. construction and installation of nest boxes where barn owls were detected during 2018 surveys, 3. design and implementation of best management practices for the protection of western toad breeding sites, identified by community outreach in 2018 (ongoing).

No Western Painted turtle have been sighted in the vicinity of our restoration projects. Although some of the off channel ponds retains adequate depth for the species, the river and most other nearby habitats are greatly reduced in area and depth at the lowest tides. Larger upstream habitats that are less tidally influenced (e.g. Blaney Bog) seem may be more suitable to the species. We will continue to monitor the site for the species and clear the nesting beach built in 2017,

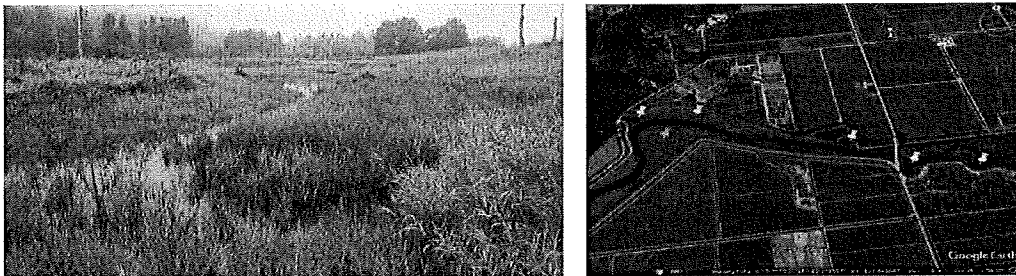
Fish and water quality monitoring in 2018 and 2019 revealed that although water temperature is too high for Salmonids in the area of the restoration sites during summer, juvenile Coho salmon were overwintering in off channel pond habitats in the North Alouette River, including the pond we constructed in 2017-2018. Monitoring of wetland plant community development revealed that wetland restoration areas to a narrow range of elevations resulted in rapid and extensive natural colonization by a diversity of native wetland plants, including sedges, rushes, cinquefoil and even sundews. Survival of planted wapato and tule has also been high in these areas. These findings have played a key role in the development of our 2020 proposal.

#### **Proposed Activities in 2020-2021**

1. **Adding large wood and boulders to increase habitat complexity in off channel ponds of the North Alouette River.** The existing ponds (figure 1) are deep but lack complexity or cover. Cover, particularly woody debris is known to increase coho carrying capacity and condition in off channel, overwintering habitats. Coastal cutthroat trout (BC Blue List) and chinook salmon also use these habitats and would benefit. Stumps and logs will be trucked to the site, anchored with cables to boulders and placed in deep water with an excavator. Clusters of boulders will also be placed in the ponds as cover.
2. **Excavation and planting of marsh benches adjoining off channel ponds.** The existing ponds lack significant shallow wetland habitats along the shores. Shallow vegetated wetlands produce large amounts of insects enhancing the food supply for fish, provide important habitat for birds, bats, and a variety of plants, including at risk and culturally important species. We plan to excavate benches to the same elevation range that resulted in high wapato planting survival and natural colonization in the nearby Neaves Street site completed in 2018 (figure 1)
3. **Abundance estimates of salmonids in off channel ponds.** We know from early spring monitoring in 2018 that Coho salmon overwinter in the North Alouette ponds, but have no data on their numbers. We propose to estimate abundance of salmonids in the ponds using standard mark-recapture methods. Briefly, fish will be trapped using baited Gee and Feddes style funnel traps. Salmonids will be marked using a subcutaneous injection of fluorescent elastomer (Northwest Marine Technologies, WA). Marking will continue over a full work week. Following a 2 week rest period, the ponds will be trapped again. The ratio of marked to unmarked fish in the catch (again over a full week) will be used to estimate abundance using the Petersen method (Krebs 1986).
4. **Installation of snags, barn owl boxes and bat boxes** 2 new sites for barn owl boxes a minimum of 1 km from established boxes will be identified and boxes installed. Additional snags will be installed around existing off channel ponds and at least one bat box installed at all restoration sites.
5. **Planting black cottonwood trees:** 500 black cottonwood (*Populus trichocarpa*) will be planted in stands of varying size at suitable sites along the Alouette River. . Large mature stands are extremely important for

nesting and roosting herons and raptors and cavity nesting birds and bats. Trees will be placed more than 50 m from existing dykes, bridges and powerlines to minimize risks to infrastructure.

6. **Continued monitoring of past habitat restoration sites** Evaluation of restoration success using an effectiveness monitoring and adaptive management framework at four FWCP-funded sites (Action 8). The framework itself is a key deliverable (available online), and includes a criteria and indicator framework for measuring success that have been vetted by experts and refined through practice<sup>2</sup>. Following actions outlined in management plans, habitat enhancement and management actions for three federally-listed species at risk (FWCP Action 20): 1. Nest box installation for barn owls, 2. Installation of large wood for great blue heron roosting and foraging, 3. Development of best management practices for western toad breeding sites identified from continuing community outreach and field inventory.
3. An outreach program which includes an updated website, public presentations, a volunteer nest-box monitoring program, and signage at restoration sites.



**Figure 1: Left: Thick natural colonization of native wetland plants at Neaves site in August 2019, 1 year after construction (left). Right: Location of Neaves Site (Green) and of existing off channel ponds with potential for enhancement (yellow).**

#### **Key Outcomes Over Five Years**

1. A watershed-scale restoration plan (available on [www.katzienaturalresources.ca](http://www.katzienaturalresources.ca)) with practical and successful guidelines for restoration practitioners, including guidelines on the control of invasive species and techniques to create habitat for species at risk, site designs, effectiveness monitoring and prioritization frameworks.
2. Improved health of populations of threatened and culturally-valued species, starting revitalization of sustainable use of culturally-valued plants by Katzie and the wider community.
3. Opportunities for Katzie and the wider community to engage and learn in a hands-on way about restoration, wildlife monitoring, and Katzie traditional knowledge and sustainable use practices.

#### **Risks**

The proposed activities with potential risks to species or the environment are the restoration activities and the fish abundance estimates. Although observational Monitoring can disturb wildlife or damage plant communities, we will use standard protocols accepted by species working groups, which are designed to minimize the magnitude of this risk to negligible. Unpredictability and complexity are inherent qualities of ecosystems, and thus restoration poses some level of risk that undesirable conditions will result. A primary risk arises from uncertainties about how invasive species will respond to restoration actions. Although our restoration efforts will involve removal of invasive species, there is a risk that the site will be re-invaded by the same or a different suite of invasive species, some of which may be more detrimental than those we removed. Through monitoring of our past restoration projects we believe we have identified a method (specific range of marsh bench elevation) that promotes natural recolonization of a native plant community with very few invasive species. We will mitigate the risk of bull frog invasion by avoiding the creation of bull frog habitat and by creating structurally complex sites (Adams and Pearl 2007). Our effectiveness monitoring framework includes measures to identify and measure risks posed by invasive species. Birds and bats can experience poor reproduction in improperly designed and placed nesting and roosting boxes. We will mitigate this risk by following well-supported protocols for design and placement of housing boxes (e.g. <http://www.batcon.org/resources/getting-involved/bat-houses>). Through monitoring and corrective action we

will ensure that birds and bats reproduce successfully in housing boxes. More generally, we will consult and follow the recommendations of experts at all stages of restoration.

### Community Engagement and Communication Plan

In 2017, we finalized and published a website [www.katzienaturalresources.ca](http://www.katzienaturalresources.ca) to host our eco-cultural restoration plan, effectiveness monitoring framework, and restoration site designs. The website is intended to act as the main vehicle for community engagement and education; one section of the website outlines how community members can become involved in our project through planting, wildlife monitoring (e.g. painted turtle sightings), and monitoring of bird nest boxes. In 2018, school-aged children visited the Neaves Road site, which provided an opportunity to educate on Katzie history, traditional knowledge and values, in addition to habitat restoration and species at risk. As past years, we will participate in annual community events (e.g. Rivers Day hosted by ARMS) where we display outreach posters, and presentations to various organizations.

### Recognition of FWCP

The FWCP logo will be displayed following logo guidelines on all printed materials and signage, and on an acknowledgements screen of public presentations. The FWCP logo is currently displayed on two signs in place at the two restoration sites near Harris Road, and will be displayed on a sign erected at the Neaves Road site (to be finalized by March 2019). The logo is also displayed on an acknowledgements page of the eco-cultural restoration plan, which is downloadable from our website [www.katzienaturalresources.ca](http://www.katzienaturalresources.ca).

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Table 1. Rationale for prioritizing species and recommended species recovery actions addressed by this project

Species of Conservation Concern	Beneficial Outcomes	Relevant recommended actions for recovery
Vancouver Island beggarticks ( <i>Bidens amplissima</i> ) <ul style="list-style-type: none"> <li>SARA Special Concern</li> </ul>	Experimentally re-introduced at enhancement sites in 2017 Monitoring of planted stands to continue in 2020	Conduct and encourage research on habitat needs and propagation guidelines to re-introduce extirpated populations and restore diminished populations. Test techniques for reintroduction and management by establishing and monitoring experimental populations (Vancouver Island Beggarticks Working Group 2014).
Western toad ( <i>Anaxyrus boreas</i> ) <ul style="list-style-type: none"> <li>SARA Special Concern</li> </ul>	Identification, mapping, stewardship of breeding sites, through outreach and implementation of best management practices for mitigation of threats to breeding sites and migrating toadlets	Identify regionally important breeding sites and terrestrial habitats; conduct outreach and stewardship (ECCC 2016; PWTWG 2014).
Western painted turtle ( <i>Chrysemys picta</i> ) <ul style="list-style-type: none"> <li>SARA Endangered</li> </ul>	Creation of over-wintering habitat Will continue to look for turtles in vicinity of site, but none observed to date. We feel that tidal water level fluctuations may be too great for them in the area.	Collect information on population trends, including a monitoring plan for individual sites and watersheds and studies to monitor population responses to habitat restoration, potential reintroductions or translocations and their effects (Western Painted Turtle Recovery Team 2010)
Great blue heron ( <i>Ardea herodias fannini</i> ) <ul style="list-style-type: none"> <li>SARA Special Concern</li> <li>BC Blue List</li> </ul>	Creation of foraging habitat through marsh excavation, creation of colony nesting habitat through planting of cottonwood saplings, creation of resting and foraging habitat through installation of large wood	Restore foraging sites and ensure adequate recruitment of large trees for nesting; conduct surveys for colonies; monitor productivity (Environment Canada 2016)
Common nighthawk ( <i>Chordeiles minor</i> ) <ul style="list-style-type: none"> <li>SARA Threatened</li> </ul>	Creation of foraging habitat through marsh excavation	Restore and create habitat. Promote volunteer participation in surveys and monitoring (ECCC 2015)
Short-eared owl ( <i>Asio flammeus</i> ) <ul style="list-style-type: none"> <li>SARA Special Concern</li> </ul>	Creation of foraging habitat through marsh excavation	Broad Strategy: Conducting surveys, monitoring and research on the species, its habitats and threats across the breeding, migrating and wintering ranges
Barn owl ( <i>Tyto alba</i> ) <ul style="list-style-type: none"> <li>SARA Threatened</li> </ul>	Creation of nesting habitat through nest box installation	Nest box installation throughout the Barn Owl's range (BC Ministry of Environment 2014)
Barn swallow ( <i>Hirundo rustica</i> ) <ul style="list-style-type: none"> <li>SARA Threatened</li> </ul>	Creation of foraging habitat through marsh excavation	Recovery/management plan pending
Band tailed pigeon ( <i>Patagioenas fasciata</i> ) <ul style="list-style-type: none"> <li>SARA Special Concern</li> </ul>	Planting of preferred food resources (elderberry shrubs)	Recovery/management plan pending
Townsend's big eared bat ( <i>Corynorhinus townsendii</i> ) <ul style="list-style-type: none"> <li>BC Blue List</li> </ul>	Creation of foraging habitat through marsh excavation, creation of roosting habitat through bat box installation	Recovery/management plan not mandated
Little brown myotis ( <i>Myotis lucifugus</i> ) <ul style="list-style-type: none"> <li>SARA Endangered</li> </ul>	Creation of foraging habitat through marsh excavation, creation of roosting habitat through bat box installation	Conserve and enhance habitat for the species and their prey throughout their Canadian distributions
Pacific water shrew ( <i>Sorex bendirii</i> ) <ul style="list-style-type: none"> <li>SARA Endangered</li> </ul>	Creation of foraging habitat through marsh excavation	Restore historical and important potential habitats to rehabilitate/retain recovery sites (Pacific Water Shrew Recovery Team 2009)

Keystone species		
Northern flicker ( <i>Colaptes auratus</i> ) Creates cavities used by many other species including birds, bats, and insects for reproduction and over-wintering.	Snags installed for nesting sites	

Culturally-valued species	Beneficial outcomes	Value
Wapato ( <i>Sagittaria latifolia</i> )	Planting to establish on marsh benches	Sacred, cultural keystone species, highly valued as traditional food
Tule ( <i>Schoenoplectus acutus</i> )	Planting to establish on marsh benches	Highly valued for basket making
Beaked hazelnut ( <i>Corylus cornuta</i> )	Planting in riparian areas at restoration sties	Highly valued as traditional food
Bog cranberry ( <i>Vaccinium oxycoccos</i> )	Planting in riparian areas at restoration sties	Highly valued as traditional food
Coho Salmon	Improved overwintering habitat	Highly valued as traditional food
Chinook Salmon	Improved overwintering habitat	Highly valued as traditional food

**Table 2. List of restoration actions to benefit priority species**

Restoration Action	Priority Species
Long-term planting of riparian cottonwood groves, to ensure continual recruitment of large cottonwood trees at the landscape scale.	Nesting habitat for great blue heron and woodpeckers; Excavated and natural cavities for secondary cavity users, including the little brown myotis and Townsend's big-eared bat.
Anchoring of large wood in aquatic zone	Improved overwintering habitat for native salmonids, especially Coho Salmon Basking and foraging sites for re-introduced western painted turtles
Clearing sand beach of vegetation	Nesting habitat for western painted turtles
Addition of large wood in riparian areas	Refuge sites to enhance habitat for western toad and small mammals, which are prey species of barn owls
Ephemerally wet sites	Experimental planting of VI beggarticks; planting of wapato; habitat for native amphibians and not for bull frogs
Planting of diverse native species to create structural complexity	Enhances habitat diversity and forage resources for all species; limits bull frog and reed canary grass invasion; enhance populations of culturally valued species to create opportunities for traditional harvest and sustainable use
Placement of bird nest boxes and bat houses	Cavity-nesting bird species with focus on barn swallow, barn owl, bat species with focus on Townsend's big eared bat and little myotis
Excavating soil at low bench sites to lower elevation and planting to create marsh habitat	Foraging habitat for all priority vertebrates, especially great blue heron