Identify, Conserve and Restore Populations of Priority Species at Risk and their Associated Habitats within the Alouette River Watershed

Final Report 2012-2013

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Executive Summary

In 2011, funding was approved for the Fish and Wildlife Compensation Program project titled “Identify, conserve and restore populations of priority species at risk and their associated habitats within the Alouette River Watershed.” In cooperation with multiple Species at Risk (SAR) Recovery Teams and stakeholders, the project is working towards the development of Best Management Practices Guidelines using a multi-species approach that can also be applied to other watersheds. For this project, these Guidelines will work towards outlining and completing actions that will compensate for some negative ecological impacts in the Alouette Watershed that resulted from the development of the Alouette-Stave Hydro Project. In order to comprehensively develop specific management and restoration recommendations several steps are being followed in this project as it relates to species at risk and their habitat.

The first year of this 5-year proposed project, was focused on ‘identifying’ species at risk and their habitat. Current occurrence information was compiled and tracking of undocumented occurrences was conducted. Mapping of these occurrences as well as species habitats were also undertaken and draft management plans (including a survey plan) were developed for several priority species; Pacific Water Shrews (Sorex bendirii), Western Painted Turtles (Chrysemys picta bellii) and Great Blue Herons (Ardea Herodias fannini), due to their high conservation framework and BC Hydro Species of Interest rankings. Habitat, including potential threats and opportunities for restoration, were assessed at several sites in Alouette Watershed, incorporating the North and the South Alouette drainages. In addition, a joint rare and culturally significant plant project was initiated with the Katzie First Nations and a Stewardship Workshop was attended by all stakeholders and participants of the project in this project year.

In this second year of the project (2012), ‘identifying’ continued with survey efforts for rare plants, Western Painted Turtles, Great Blue Herons and highly suitable Pacific Water Shrew habitat was further mapped and ground-truthed. In addition, survey efforts for Amphibian SAR including; Red-legged Frogs (Rana aurora), Pacific Tailed Frogs (Ascaphus truei) and Western Toad (Anaxyrus boreas) as well as surveys for Western Screech Owls (Megascops kennicottii kennicottii) were initiated. Priority sites identified for potential restoration had Action Plans developed, were surveyed for all SAR and had consultation and/or restoration completed in cooperation with a variety of stakeholders and partners as part of initiating the ‘conserving’ and ‘restoring’ portions of the project.
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1. Introduction
The Alouette Dam, as part of the Alouette-Stave Falls Ruskin generating complex, was constructed in 1926 and was replaced by BC Hydro in 1984 with a modern earth-fill structure. Prior to the development of the Peace River hydro project, the Alouette-Stave Falls Ruskin generating complex (consisting of 4 dams), provided the bulk of the power used in the Lower Mainland (BC Hydro, 2011a; BCRP, 2000) (Figure 1). The full extent of how the construction of this project has affected both species distributions and available habitat in the Alouette Watershed is unknown and has been identified as needing further research to identify methods to compensate for any negative impacts (BCRP, 2011b).

Construction of the dams has resulted in footprint issues and impacts on wildlife and habitats, including loss of coniferous forest and riverine habitats, flooding of lowland forest (33 ha) and upland forest (340 ha) and loss of valley bottom and valley side coniferous forest and associated wildlife losses (BCRP, 2000).

Figure 1. The Alouette Watershed Hydropower project in the Lower Mainland, BC (BC Hydro, 2011a).
Significant impacts specific to riparian and wetland habitats have also been identified, including fluctuating reservoir water levels of 9.5m which effects the establishment of aquatic and riparian vegetation in draw down zone, inundated 0.3 km of mainstem and 4 km of tributaries and associated riparian habitat upstream of the dam, loss of in-stream, riparian and upland habitat and reduction in the recruitment of large woody debris (LWD) downstream of the Dam and in the Lower Alouette River (BCRP, 2000; BC Hydro, 2011c).

Impacts to species at risk are also significant and many species likely to be found within the watershed were assessed for priority to the Fish and Wildlife Compensation Program. Twelve mammal species were identified, with Pacific Water Shrew being one of two species assigned a high priority. There were 22 birds and 9 reptile/amphibian species identified, with Great Blue Herons and Western Painted Turtles, respectively, also assigned high priority (BC Hydro, 2011b).

2. Goals and Objectives
The goal of the project is to identify, conserve and restore priority species at risk and their habitat within the Alouette River watershed. The first step for the project was to compile existing occurrences of all species of risk using Conservation Data Centre requests, reviewing reports available from various stakeholders and local residents. Updated occurrences were also tracked for all species. Pacific Water Shrews (*Sorex bendirii*), Western Painted Turtles (*Chrysemys picta bellii*) and Great Blue Herons (*Ardea Herodias fannini*) were selected as a priority species in the first year, due to their high Conservation Framework and BC Hydro Species of Interest Action Plan rankings, as well as the availability of Best Management Practices developed for shrews (Craig et al., 2009) for use in Stewardship and Partnership activities. Second year included the addition of several other high ranking species (Red-legged Frogs (*Rana aurora*), Pacific Tailed Frogs (*Ascaphus truei*) and Western Toad (*Anaxyrus boreas*) and Western Screech Owls (*Megascops kennicottii kennicottii*) as well as consultation with stakeholders and partners in regards to restoration at priority sites.

Specifically these goals will be achieved through these objectives:

1. Mapping all species at risk occurrences, including historical and recent, to provide a spatial representation of overlapping occurrences and priorities for future conservation, restoration and stewardship efforts.
3. Identifying specific threats to the priority species and their habitats, protecting occupied sites, and restoring degraded habitat.
4. Preventing further population declines, habitat loss and degradation through increased accessibility to data, as well as public outreach and education designed to enhance awareness and stewardship of the species and its habitat, specifically through the use of Best Management Practices Guidelines.
3. Study Area
The Alouette Watershed is located next to the Stave Watershed, 50 km east of Vancouver, and has a drainage area of 200m$^2$ (BC Hydro, 2011a) (Figure 2). Our Area of Interest (AOI) for the first two years of the project has been defined as the provincial Assessed Watershed boundary. In the future, the study area may also expand to the nearby Stave Watershed, possibly due to habitat ranges of priority species extending to both watersheds and to expand restoration efforts.

![Figure 2. The Alouette Watershed boundary (AOI for 2011-12/2012-13 Alouette Species at Risk Project)](image)

4. Methods
a. Area of Interest Delineation and Mapping
The area of interest was delineated using an ‘Assessed Watershed’ Geographic Information Systems (GIS) layer from the provincial government site providing public access to GIS information, the GEOBC Gateway (source: http://geobc.gov.bc.ca/) and from description and map provided in the BC Hydro Alouette Watershed Plan (BC Hydro, 2011). Historic observations were obtained through the Conservation Data Centre (CDC) (source: http://www.env.gov.bc.ca/cdc/), whose data layers are also available through the GEOBC Gateway. Additional layers from GEOBC were also used to map priority species habitats as presented in their Species Management Plans (See Appendix IV in 2011-12 report).
b. Surveying

Surveying in the first year of the project has been largely conducted via visual observations at sites visited as part of site assessments (see below). However, visits were also conducted at known and historical occurrences for Western Painted Turtle and Great Blue Heron in the study area (refer to Species Management Plans (See Appendix IV from 2011-12 report) for species-specific survey methods). While the first project year was focused on identifying habitat and developing survey plans over the next 5 years for Western Painted Turtles and Great Blue Heron, a significant survey (trapping) effort was undertaken for Pacific Water Shrew. Some amphibian surveys were conducted in March 2012 as part of Western Painted Turtle Recovery Project funds covering co-existing species and a Ministry of Forests, Lands and Natural Resource Operations area-wide project on identifying Red-legged Frog breeding sites. Some of these surveys overlapped with sites in the Alouette Watershed and this information will be added to the available occurrence information and led into Amphibian surveys conducted in the watershed as part of Year 2. Western Screech Owls were also added to the species-targeted surveys in the 2012-13 project year and rare plant surveys were focused at priority restoration sites.

c. Site Assessments

Sites visited to be assessed were selected via coordination and communication with the Alouette River Watershed Society (ARMS), the Alouette Naturalists, Department of Fisheries and Oceans, Ducks Unlimited, Metro Vancouver Parks, District of Maple Ridge, local residents and any group conducting activities in the watershed. A list was compiled on sites that had had restoration works done in the past, have works upcoming (either in a restoration or construction nature) as well sites identified by others as in need of restoration but no works are currently planned. Site assessments involved a visit to the site by the project biologist accompanied by the respective landholders or partners in the management of the site and recording location, directions to the site, land tenure, what/if any species sightings had been recorded, what works had already been completed, what potential habitat was available and what could be done to enhance the site for the target species and species at risk in general. In 2012, this information was formalized in the individual site Restoration Action Plans and formal species surveys were conducted at these sites.

Figure 3. Sites assessed for restoration. Polder Wetland (left) and Golden Pond (right). Photos by Aimee Mitchell.
5. Results

a. Historic and Recent Species at Risk Occurrences

Records, both sensitive and non-sensitive, were obtained from the Conservation Data Centre (CDC). In addition, meetings were held with the Alouette Naturalists, the Alouette River Management Society and other stakeholders to obtain any records they may possess as well as to discuss any priority species or indications of declines observed by them (Figure 4).

Previous records in the area have only confirmed two occurrences for Pacific Water Shrew, near Loon and Blaney Lakes in the UBC Research Forest in 1973 and 1974 respectively (Hawes, 1974). However, because of the age of these observations (>20 years) they are no longer consider currently occupied but rather historical observations (Pacific Water Shrew Recovery Team, 2009).

Great Blue Heron declines have been observed in the Alouette Watershed. Of the 10 colonies in and around the boundary of the Alouette Watershed only one remains active, the Alouette River Colony (See Species Management Plan from first year of project). Three of the colonies no longer have nests present and many have had trees removed. The size of the Alouette River Colony has also been declining, particularly over the last 5 years with the number of active nests diminishing by roughly 50% (from approximately 80 nests down to just 40) (BC Hydro, 2011b and Species Management Plan from Year 1).
In the last 3 years of monitoring (2010-2012) the colony has also experienced complete colony failure and has not produced any fledged young.

Currently, 18 occupied sites are known for Western Painted Turtles in the Lower Mainland/Fraser Valley, with nearly all of the populations in the region at risk of extirpation, with less than 20 individuals present (Kilburn and Mitchell, 2011; A. Mitchell, 2011). Of these 18 sites only one exists in the Alouette Watershed and the 1 individual observed at that site, Jerry Sulina Municipal Park, has not been observed since 2007 (Semproni and Oglivie, 2007). The site management plan for the currently occupied site was also provided along with the Watershed Species Management Plan provided in the first year of the project.

Since the initiation of the project 31 (13 in 2011-12 and 18 in 2012-13) new species at risk occurrences have been documented in the Alouette Watershed (Figure 5). This includes a new Pacific Water Shrew occurrence near the Alouette River and Golden Pond, just south of the Alouette Dam that is the result of suitability mapping and trapping efforts through this project. This is now only one of 25 known locations for this species.

![Figure 5. New Species at Risk Occurrences in the Alouette Watershed (since project inception)](image)
b. Surveys and Species Management Plans

Habitat mapping results and survey plans for the various priority species; Pacific Water Shrews (*Sorex bendirii*), Western Painted Turtles (*Chrysemys picta bellii*) and Great Blue Herons (*Ardea Herodias fannini*), are contained in their respective Species Management Plans in Appendix IV provided in the first year of the project.

In relation to Pacific Water Shrew, the project coordinator has been working with two Pacific Water Shrew experts to map suitable habitat (Vanessa Craig) and to trap shrews (Denis Knopp) for an increase in occurrence records. Both landscape and SHIM (Sensitive Habitat Inventory Modelling) models have been run to identify high, moderate, low and nil suitable habitat to focus efforts for potential restoration and trapping. With the assistance of the project coordinator one trapping session was completed in early September at Golden Pond, just south of the Alouette Dam. An additional trapping session was conducted at the same location in October. During the first trapping session (which included 7 nights and 3 trap checks per day), no shrews were captured but several other species at risk were captured in aquatic Gee traps or observed, including Red-legged Frogs, Pacific Tailed Frogs, and Great Blue Herons. During the second session (8 nights and 3 checks per day) resulted in a Pacific Water Shrew capture in a Gee Minnow trap near the Alouette River on the last day of trapping (Knopp and Larkin, 2011 – also included in Appendix IV in 2011-12). Critical habitat delineation as part of the Federal Recovery Strategy is in the process of being produced for all Pacific Water Shrew occupied sites and will provide valuable information for potential protection measures to be implemented at Golden Pond. In 2012, ground-truthing of habitat mapping and surveys at restoration sites highlighted areas of moderate to high suitability for restoration and protection. Several sites, including Coniagas Channel, 232nd Channel, Latimer Channel and Golden Pond, had restoration activities completed that directly benefited shrews and/or had signage placed to protect currently high quality habitat in the watershed.

As part of the Western Painted Turtle Recovery Team, Aimee Mitchell also took the lead on developing a turtle survey plan for the watershed with surveys to be completed over the next five years. This plan includes mapping suitable ponds, sloughs, and wetlands delineated using GIS and broken down into over 41 survey areas. To date, all of these areas have had an initial survey completed. Some sites were determined not worthy of further surveying following ground-truthing but the remaining sites will be surveyed annually. This survey work was sponsored by Habitat Stewardship Funding (HSP) through the project: *Recovery of the Western Painted Turtle and associated Species at Risk in the Lower Mainland/Fraser River Valley*. In addition to survey work a Site Management Plan has been developed for the only known occupied Western Painted Turtle site in the Alouette, Jerry Sulina Municipal Park. Restoration activities, planned last year are underway and have thus far included fencing off an area around the pond (done in-kind by the District of Maple Ridge) and ground cover will be placed over canary reed grass to prepare the area for native plant installation. A turtle nesting beach is also planned for this site in 2013.

In collaboration with the Heron Working Group, nesting monitoring was conducted in spring 2011 at the only known (at the time) active Great Blue Heron nesting colony in the Alouette Watershed, the Alouette River Colony, also near Jerry Sulina Municipal Park. Monitoring was conducted through this
group by Dan Shervill (provided in-kind) of the Canadian Wildlife Service as part of yearly monitoring conducted at all active heron nesting colony in the Lower Mainland and Sunshine Coast. Monitoring data on this colony has been provided and has been incorporated into the Species Management Plan. Historical colony locations were also provided by the Ministry of Forests, Lands and Natural Resource Operations and the Conservation Data Centre and visited by the project coordinator. Mapping of foraging and nesting habitat mapping as well as a 5-year survey plan for locating nests is also located in the Species Management Plan. Surveys were conducted early in 2013 at restoration sites and foraging locations. Late winter/early spring is the best time to observe herons in foraging habitat and tracking them to their nesting locations. Although no nesting locations were detected during these surveys, they have confirmed the importance of many of the restoration sites (i.e., Jerry Sulina, Coniagas Channel and Hale Road) to heron foraging and restoration at these sites will increase foraging opportunities. In addition, an observation of nesting Herons was reported in the UBC Research Forest, representing a new second colony known in the Alouette Watershed.

Additional priority species added in 2012-13 included a variety of survey efforts to locate. In the case of amphibian SAR, egg mass surveys sponsored by funding from Western Painted Turtle Recovery and a region-wide Red-legged Frog MNFLNRO inventory project was conducted in early 2012, with Red-legged Frog breeding confirmed at 2 new sites in the Alouette Watershed, Golden Pond and Blaney Bog. Visual ground surveys for Western Toad breeding sites (to best way to search for toads and also identify a critical habitat in need of protection) were conducted in late July and into August at suitable toad sites based on mapping and also from local reports of toads or tadpoles. Late summer is the time when Western Toad tadpoles are highly visible in breeding ponds, begin to metamorph and will leave the ponds en masse. No breeding sites were confirmed in 2012 but several sites will be surveyed in 2013 as well in an attempt to find breeding sites within the Alouette. However, many adults toads were discovered migrating on a road in the UBC Research Forest in the fall, likely leaving their summer habitat and heading upland to overwinter. This location now provides a good indication of a nearby breeding pond to check in summer 2013. Twenty-nine Pacific Tailed Frog surveys, involving in-stream use of nests to catch tadpoles, were conducted in September and October 2012. Eleven streams were identified with Pacific Tailed Frogs of varying ages (Tailed Frogs remain in a tadpole stage for the first 4-5 years of life, each year the gradually get bigger and acquire limbs but remain aquatic suctioning to rocks in streams). Several basins have been identified as potential WHAs (Wildlife Habitat Areas) for this species (Figure 5).

Fourty-nine call playback stations for Western Screech Owl were established throughout the watershed (Figure 6). Three survey repetitions were conducted for this species; one in September (primarily to establish survey stations) and two in February and March (during breeding season). Although, no confirmed detections were made during surveys, a couple reports of owls responding were made by locals near their private properties. Currently, the project is coordinating visiting these properties and confirming/denying presence. In addition, three Short-eared owl (another SAR owl – Blue listed) occurrences resulted from surveys and records are now also available on invasive Barred Owl distribution in the watershed and within the Lower Mainland and Fraser Valley.
Figure 6. Sites surveyed for Pacific Tailed Frog in Alouette Watershed in 2012-13

Figure 7. Sites surveyed for Western Screech Owl in Alouette Watershed in 2012-13
c. Sites Assessed for Restoration
A summary of sites visited and assessed for restoration potential for Species at Risk (SAR) throughout the Alouette Watershed has been developed (Figure 8 and Table 1). Fourteen sites have been visited and all had preliminary assessments completed for focal SAR for 2011-2012, as well as rare plants. However, formal surveys for relevant SAR was conducted in 2012-2013. Prescriptions for restoration in the format of Restoration Action Plans (Appendix V) were developed in 2012-13 but planning had already begun at three assessed sites in 2011; Jerry Sulina (through the Western Painted Turtle Recovery work), Codd Wetlands (through coordination with Ducks Unlimited who are planning major works there within 5 years) and Golden Pond (through Pacific Water Shrew Recovery work). In 2012-13, appropriate stakeholders and landholders were contacted at all sites and restoration activities were undertaken at an additional five; Golden Ears Park Day Use Area, 232nd Channel, Horseman’s Park, Maple Ridge Park, and Stewart Ponds/Coniagas Channel.

Following further surveys and assessment through the Restoration Action Plan development process two sites have been determined to not need restoration but rather should be protected and identified with signage for their high habitat value; Spirea Trail and Latimer Channel. One other site, Mike Lake is also worthy of signage but could also benefit from additional Course Woody Debris (CWD), which BC Parks has generously offered to provide and transport. Signage for these sites are being produced and will be installed in spring/summer 2013. Discussions for works at Blaney Bog began in 2011 but now a formal Restoration Plan has been provided to Metro Vancouver Parks. They have expressed interest in working cooperatively but have not yet provided a time with this work could be done. This may be an important site for works in the 4th or 5th year of the project when MV Parks is available to coordinate. The Hale Road site has been selected as the focal site for Year 3 of this project (2013-14) and will involve extensive restoration of a low bench river site to include off-channel habitat for fish and foraging herons, ponds for amphibian SAR, creation of benches to support the introduction of plant SAR as well as improving habitat for select culturally valued plants.
**Figure 8.** Sites assessed for Restoration in the Alouette Watershed.
**Table 1.** Survey summary of sites assessed for Restoration in the Alouette Watershed

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Easting</th>
<th>Northing</th>
<th>WPT confirmed</th>
<th>RES confirmed</th>
<th>GBH Confirmed</th>
<th>PWS confirmed / habitat</th>
<th>RLF confirmed</th>
<th>WSOW confirmed</th>
<th>SEOW confirmed</th>
<th>Rare plants confirmed</th>
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<tr>
<td>Jerry Sulina Municipal Park</td>
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<td>Mod</td>
<td>X</td>
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<td>X</td>
<td>W. Watermilfoil</td>
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<td>Y</td>
<td>Y</td>
<td>Mod</td>
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<td>Mod</td>
<td>X</td>
<td>-</td>
<td>Y</td>
<td>W. Watermilfoil</td>
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</table>

WPT = Western Painted Turtle, RES = Red-eared Slider (non-native), GBH = Great Blue Heron, PWS = Pacific Water Shrew, RLF = Red-legged Frog, WSOW = Western Screech Owl, SEOW = Short-eared Owl

Y* - previously confirmed but not during project, Y - confirmed during project, X - surveyed but not detected and '-' Not suitable to survey for species/not surveyed.
Table 2. Works summary of sites assessed for Restoration in the Alouette Watershed

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Easting</th>
<th>Northing</th>
<th>Landholder / Partners</th>
<th>Focal SAR for Restoration*</th>
<th>Status of Project Restoration</th>
<th>Proposed Future Restoration</th>
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</thead>
<tbody>
<tr>
<td>Jerry Sulina Municipal Park</td>
<td>526333</td>
<td>5454428</td>
<td>District of Maple Ridge, ARMS, DFO</td>
<td>WPT, PWS, GBH, GRH</td>
<td>Fenced area for turtles, SAR sign produced, being installed</td>
<td>Invasive Plant control, turtle beach and CWD installation, native species planting and plant SAR introduction</td>
</tr>
<tr>
<td>Stewart Ponds/Coniagas Channel</td>
<td>526502</td>
<td>5454629</td>
<td>ARMS, Private landowner</td>
<td>WPT, PWS, GBH, GRH</td>
<td>Native plant prescription, planting and protection, advising on channel and CWD installation</td>
<td>Follow up monitoring, plant SAR introduction</td>
</tr>
<tr>
<td>Blaney Bog Park Reserve</td>
<td>529248</td>
<td>5456495</td>
<td>Metro Vancouver Parks</td>
<td>RLF, PWS, GBH</td>
<td>Consultation with Metro Vancouver Parks, waiting for permission</td>
<td>Flood out Spirea, allow seasonal flooding, create open pools, pollution mitigation</td>
</tr>
<tr>
<td>Codd Wetlands/DU wetland project</td>
<td>527528</td>
<td>5457588</td>
<td>Metro Vancouver Parks / Ducks Unlimited</td>
<td>RLF, PWS, GBH, WETO</td>
<td>Consultation with Metro Vancouver Parks and Ducks Unlimited</td>
<td>Maintain some portion of DU pond once dyke breached, non-native species removal</td>
</tr>
<tr>
<td>232nd Intake</td>
<td>530541</td>
<td>5454107</td>
<td>ARMS, DFO, Private strata corporation</td>
<td>RLF, PWS, GBH, WPT</td>
<td>Invasive Plant control (Japanese Knotweed), native species planting</td>
<td>Follow up monitoring, CWD installation, native aquatic plant introduction</td>
</tr>
<tr>
<td>Latimer Channel</td>
<td>531993</td>
<td>5453657</td>
<td>District of Maple Ridge, ARMS, DFO</td>
<td>PWS</td>
<td>Assessed as high quality PWS habitat to be identified with signage</td>
<td>Install signage</td>
</tr>
<tr>
<td>Mike Lake and area</td>
<td>535228</td>
<td>5458249</td>
<td>BC Parks</td>
<td>RLF, PWS, GBH, WPT, WETO</td>
<td>Assessed as high quality PWS habitat to be identified with signage</td>
<td>Install signage and CWD for all species listed</td>
</tr>
<tr>
<td>Spiraea Trail</td>
<td>536405</td>
<td>5458994</td>
<td>BC Parks</td>
<td>RLF, PWS, WETO</td>
<td>Wetland assessed as sensitive habitat due to native plant species and rare habitat, no restoration recommended</td>
<td>Forested area around wetland could be thinned b/c too dense, dark second-growth forest, costly activity out of scope of this project</td>
</tr>
<tr>
<td>Golden Ears Day Use Area</td>
<td>539163</td>
<td>5463580</td>
<td>BC Parks</td>
<td>WSOW, TAFR, PWS</td>
<td>Consulted on planting prescription, CWD placement and maintaining of riparian/deciduous trees</td>
<td>Follow-up surveys for SAR</td>
</tr>
<tr>
<td>Alco Municipal Park</td>
<td>533989</td>
<td>5454676</td>
<td>District of Maple Ridge, Environmental School</td>
<td>WSOW, PWS</td>
<td>Consultation with District of Maple Ridge</td>
<td>Planting riparian vegetation and rare plants</td>
</tr>
<tr>
<td>Golden Pond</td>
<td>535897</td>
<td>5457768</td>
<td>ARMS, DFO, BC Hydro</td>
<td>RLF, PWS, GBH, WSO</td>
<td>Planting of native vegetation along road and near river, signage installed, PWS critical habitat polygon</td>
<td>Follow-up monitoring, plant shrubs around pond and in nearby forest where trails and trampling have occurred</td>
</tr>
<tr>
<td>Maple Ridge Park</td>
<td>530689</td>
<td>5454327</td>
<td>District of Maple Ridge</td>
<td>GBH, PWS, WSO</td>
<td>Invasive plant removal (Blackberry)</td>
<td>Off channel pond construction, more invasive species removal, native plant introduction, CWD and interpretive sign installation</td>
</tr>
<tr>
<td>Horseman Park</td>
<td>529106</td>
<td>5453638</td>
<td>District of Maple Ridge</td>
<td>GBH, PWS, WSO</td>
<td>Invasive plant control (Japanese Knotweed)</td>
<td>Pond construction, more invasive species removal, native plant introduction, CWD and interpretive sign installation</td>
</tr>
<tr>
<td>Hale Road - Low Bench on Alouette River</td>
<td>523717</td>
<td>5457247</td>
<td>City of Pitt Meadows, ARMS, DFO, Ridge Meadows Parks</td>
<td>GBH, PWS, WETO, SEOW</td>
<td>Proposal provided and approved by City, Consultation with ARMS, DFO and Ridge Meadows</td>
<td>Pond and berm construction, Invasive plant control, Introduction of plant SAR, CWD installation, channel improvement</td>
</tr>
</tbody>
</table>

*WPT = Western Painted Turtle, GBH = Great Blue Heron, GRH = Green Heron, PWS = Pacific Water Shrew, RLF = Red-legged Frog, WETO = Western Toad, SEOW = Short-eared Owl, WSOW = Western Screech Owl, TAFR = Pacific Tailed Frog
d. Rare and Culturally Significant Plant Project

As a valuable late addition to the project the first project year, a survey plan for rare and culturally-significant plants in the Watershed was developed for future years (See 2011-12 report). Kelly Squires, a PhD candidate at Simon Fraser University, took the lead developing a survey plan and protocol in 2011-12. In collaboration with Katzie First Nations and with the help of an assistant for this project, Laurie Sylvester, as well as a plant Specialist, Terry MacIntosh, rare plant surveys were conducted in conjunction with culturally significant plant surveys for the region in the 2012-13 project year (Appendix IV).

e. Partnership building and Species at Risk Stewardship Practices Workshop

Since the inception of the project multiple partnerships have been formed and will continue to be fostered. In attempts to partner and coordinate on any works that have occurred or will potentially occur in the Watershed, connections have been made with: the Katzie First Nations, the Alouette River Management Society, the Alouette Naturalists, Community Education on Environment and Development Society, Department of Fisheries and Oceans, Ducks Unlimited, Metro Vancouver Parks, South Coast Conservation Program, the Land Conservancy of British Columbia, District of Maple Ridge and private landowners. Through these partnerships collaborative restoration practices, or Best Management Practices (BMPs) that consider as many species as possible are proposed to be developed. In addition, engagement in restoration activities will take a multi-partner approach and incorporate local communities and volunteers as much as possible.

A Stewardship Practices Workshop for the project took place February 23rd, 2012 at the Rivers Heritage Centre hosted by the Alouette River Management Society (See 2011-12 Report: for workshop agenda and copy of Power Point presentation about the project). Pamela Zevit, who has worked extensively with the South Coast Conservation Program, took the lead on coordinating the workshop. The workshop was attended by many different partners and participants in the project to further solidify relationships for working towards a common goal of multi-species restoration and the development of best management practices. A blessing was graciously given by Willie Pierre, an Elder of the Katzie First Nations. Presentations were also given by Kym Welstead of the Ministry of Forests, Lands and Natural Resource Operations, Dave Nanson of the Department of Fisheries and Oceans, Denis Knopp of BC’s Wild Heritage Environmental Consultants, Ian Giesbrecht for the Rare and Culturally Significant Plant Projects and Pamela Zevit of the South Coast Conservation Program (Figure 9).
6. Discussion
An increase in Species at Risk (SAR) occurrences in the Alouette Watershed has already been observed in the first two years of the project. And with the detailed Species Management Plans and corresponding survey plans, as well as with the SAR surveys for all sites assessed for restoration, these occurrences are expected to continue to increase over the duration of the proposed project term of five years. Restoration Action Plans developed for 14 sites identified have laid out all the potential actions and some restoration has been conducted at more than half of the sites identified. Restoration activities will further increase occurrences and presence of species at risk, such as through rare plant stocking of suitable habitat. Success has already been displayed in the project with the various partnerships that have been formed, communications opened and commitments made to working towards common multi-species best management plans for restoration.

7. Recommendations
Current management recommendations for Pacific Water Shrew in the Alouette River Watershed are focused on the Golden Pond occurrence, the only current observation in the watershed. This site is high quality for Pacific Water Shrew and is used by other species at risk, including Red-legged Frogs (*Rana aurora*) and Great Blue Herons (*Ardea herodias fannini*). The primary management recommendation for this site would be to apply some protection measures. A federal critical habitat polygon was delineated and restoration of some areas have been conducted.

Management recommendations for any further identified occurrences in the watershed will be based on site-specific threat assessments, but will likely primarily be focused on protection measures and encourage the use of the Best Management Practices developed for this species. The first two years of the project was largely devoted to identifying potential habitat, conducting trapping efforts but future
years will focus on restoration projects throughout the watershed that benefit Pacific Water Shrew. It is recommended that restoration activities be undertaken throughout the watershed in low quality or degraded Pacific Water Shrew Habitat and any proposed activities identified to be undertaken by others in moderate or high quality habitat be mitigated for any potential negative effects on Pacific Water Shrew survival.

Detailed management recommendations for the Alouette River Watershed for occupied Western Painted Turtle sites are encompassed in the *Site Management Plan for Jerry Sulina Municipal Park* (Appendix I in the Species Management Plan for this species in Year 1 report), the only currently designated occupied site in the watershed. These recommendations include installation of basking logs, a nesting beach and interpretive signage. Consultation has been conducted with the District of Maple Ridge and some restoration activities has been implemented in 2012-13.

Management recommendations for any further identified occupied sites in the watershed will be based on site-specific threat assessments laid out in Restoration Action Plans. Recommendations for currently unoccupied but suitable or potential habitat (identified in the survey plan) will be made based on survey results and where feasible restoration efforts may be recommended at sites identified as highly suitable and have potential as an augmentation site in the future. The Western Painted Turtle Recovery Team is currently reviewing and assessing the feasibility of augmentation (via head-started hatchlings) for turtle populations with high risk of extirpation, many of which exist in the Lower Mainland/Fraser Valley.

Current management recommendations for Great Blue Herons in the Alouette River Watershed are focused on the Alouette River Colony, the only currently active site in the watershed. The nest trees at this site are deteriorating and planting of additional trees could encourage increased reoccupation and provide additional nesting habitat. However, the effect of this action would be delayed. Enhancement of foraging habitat at this site will occur simultaneously with Western Painted Turtle habitat enhancement activities planned for 2013. Installation of basking logs in the nearby pond in Jerry Sulina Municipal Park will provide foraging platforms for herons in the colony. Management recommendations for any further identified colonies in the watershed will be based on site-specific threat assessments, but will likely primarily be focused on protection measures to ensure a more recently formed colony can persist and is not disturbed. Two other occurrences have been identified for Herons but surveys will continue. While obtaining more information following survey efforts in the watershed the importance of additional management recommendations may become apparent. The Great Blue Heron Working Group is currently refining a range-wide management plan as part of the Federal Species at Risk Management Plan series and once that management plan is finalized it may provide further direction in management activities that should be undertaken to benefit Great Blue Herons in the Alouette River Watershed.

Sites assessed for restoration will have site-specific management recommendations as surveys and proposed projects progress. Restoration activities that incorporate multi-species are recommended at all assessed sites. In terms of rare and culturally significant plant species, site-specific management recommendations have come as surveying was completed. Some recommendations already made include incorporating planting of native species (i.e., Streambank Lupine *Lupinus rivularis*) where
potential habitat has been identified, such as at Jerry Sulina in coordination with Western Painted Turtle nesting beach enhancement.

8. Acknowledgements

Partners/Supporters:

The project was made possible by funding of BC Hydro’s Fish and Wildlife Compensation Program and BC Hydro Staff including, Brent Wilson and Breanne Wilson provided important information on access and participated in project activities. In addition to writing the proposal for this project, Kym Welstead, the Species at Risk Biologist at the Ministry of Forest, Lands and Natural Resource Operations (MFLNRO) for the South Coast Region, provided in-kind project management. Kym Welstead has also provided direction, contacts, field support and information on the species at risk occurrences in the Watershed. The British Columbia Conservation Foundation (Joanne Neilson) provided administrative support for this project, including co-coordinating various members of the project in terms work contracts and reporting.

The Katzie First Nations, including Debbie Miller, Roma Leon, and Laurie Sylvester, have provided support and coordination of a joint culturally-significant and rare plant species project. This project also had the valuable contributions of Kelly Squires, PhD Candidate with Simon Fraser University and Ian Giesbrecht, an Ecologist with West Ecological, by developing a watershed-wide survey plan and site-specific recommendations for Sites Assessed for Restoration.

Pamela Zevit, of the South Coast Conservation Program (SCCP), coordinated the very successful Stewardship Practices Workshop for this project incorporating all project partners, supporters and Katzie First Nations blessings. She has provided a variety of information of species at risk such as presented in Factsheets produced by the SCCP. The Land Conservancy of British Columbia (Tasmin Baker for the SCCP also) has also provided support in terms of working with partnerships they have formed.

The Alouette Naturalists (Duane Vandenberg) and the Alouette River Management Society (Amanda Balcke) provided any species records they possessed and provided valuable information on any priority species or indications of declines observed by them. These groups also provided important contacts in terms of projects they had previously worked cooperatively on or intended to work on in the watershed, helping direct the development of the Sites Assessed for Restoration List.

Matt Foy and Dave Nanson, of the Department of Fisheries and Oceans graciously took time to conduct site visits where they had or intend on conducting works, continue to consult on survey and restoration efforts and presented on our common goal of multi-species restoration at the Stewardship Practices Workshop. Dan Buffet of Ducks Unlimited has committed significant time to incorporating multi-species approaches into upcoming works at one of their sites in the Alouette Watershed and we will continue to work cooperatively with them to restore tidal flow while maintaining some freshwater habitat in the Polder Wetland.
Janice Javis, Wayne Mather and Jason Lerox of Metro Vancouver Parks have been extremely helpful in providing access and expressing interest in cooperative efforts for restoration at their sites in the Watershed. District of Maple Ridge (Rodney Stott) has provided support in terms of mapping information and expression of interest in coordinating restoration at assessed sites in Municipal Parks. Ken Stewart, a private landowner, has been very willing to provide access and continue restoration activities already begun by ARMS and coordinated with this project.

Research:

Denis Knopp, an independent contractor specializing in species at risk inventories, conducted the Pacific Water Shrew assessment (trapping) activities for this project. Vanessa Craig, PhD, also an independent contractor and Pacific Water Shrew expert, aided the project biologist in habitat mapping on this project to identify suitable habitat via the models she developed.

Christopher Currie of the South Coast Western Painted Turtle Recovery Project (SCWPTRP) contributed significant effort to literature review and synthesis as well as mapping for the Western Painted Turtles management plan in the Alouette Watershed. In addition, Christopher Currie, Aimee Mitchel, Justin Suraci and Vanessa Kilburn of the SCWPTRP, primarily sponsored through Habitat Stewardship Program (HSP) funding, contributed background survey information and links to outreach and restoration initiatives at the currently Western Painted Turtle occupied site, Jerry Sulina Municipal Park, including sign posting and partnership with the District in Maple Ridge for habitat restoration at this site.

Dan Shervill of the Canadian Wildlife Service Canada (CWS) and in cooperation with the Great Blue Heron Working Group, provided background survey and population baseline data for the currently known and active heron colony (Alouette River). Ross Vennesland, of Parks Canada, and Kym Welstead, of the BC Ministry of Forests, Lands and Natural Resource Operations, provided historical and recent monitoring data on the Alouette River Colony and advice on behalf of the Great Blue Heron Working Group on foraging and nesting habitat surveying. Christopher Currie of the British Columbia Institute of Technology (BCIT) Fish, Wildlife and Recreation Program contributed significant effort to literature review and synthesis as well as provided general technical advice in mapping for this species management plan.

9. References


Mitchell, A. 2011. Personal observation. Research Biologist, South Coast Western Painted Turtle Project. Vancouver, BC. Email: athene.aimee@gmail.com
