

Western Painted Turtle Surveys and Stewardship Activities on Vancouver Island in 2013



Western Painted Turtle at Airport Wetlands, Alberni Valley. Photo by C.Engelstoft.

Prepared for

Habitat Acquisition Trust, Victoria, B.C.

Prepared by

Christian Engelstoft, MSc, RPBio, and Kristiina Ovaska, PhD

Funded by Habitat Stewardship Program (Environment Canada), Capital Regional District Parks, and Public Conservation Assistance Fund

MARCH 2014

Acknowledgments

We are grateful to Adam Taylor for managing the project and for his continuing support, advice, and encouragement. Thanks to Todd Carnahan, who conducted outreach activities, coordinated landowner visits, and provided observations. We much appreciate the support from Marilyn Fuchs for our activities in CRD regional parks. Colleen Long organized CRD Parks volunteers to maintain habitat restoration sites in Elk-Beaver Lake Regional Park.

We are thankful to June Pretzer and Jay Rastogi from Swan Lake and Christmas Hill Nature Sanctuary for their enthusiastic support of the project and the help of sanctuary staff and volunteers to monitor nesting sites. Marie Robertson and Rick Royer (Integrated Water Services CRD) organized the donation from a private landowner and the delivery of logs for turtle basking habitat enhancement in Swan Lake.

In the Alberni Valley, Rick and Libby Avis, Alberni Valley Enhancement Society, continued to support our activities, accompanied us in the field, and provided invaluable logistical assistance, including once again sharing their home with us. Morgan Kennah, Island Timberlands, allowed us access to their private forestry lands and supported habitat enhancement and threat mitigation activities on Island Timberlands' holdings.

In the Cowichan Valley we thank Kai Rietzel (Cowichan Land Trust) for organizing access to survey sites and participating in surveys.

This project was funded by Environment Canada's Habitat Stewardship Program grant to Habitat Acquisition Trust and Cowichan Land Trust. Additional funding came from CRD Regional Parks.

Executive Summary

Western Painted Turtles (*Chrysemys picta bellii*) on the Pacific coast are endangered in Canada and on the provincial Red List of species at risk in British Columbia. Most of their range on Vancouver Island is on private lands within either residential or forestry lands, where they are faced with numerous threats. Within the Capital Regional District (CRD), regional parks and other protected area provide refuges for turtles and other wildlife, but these multi-use areas need to be managed to incorporate specific requirements by turtles and to reduce threats from recreational and other activities.

Annually since 2008, we have carried out studies in the CRD and Alberni Valley with the goal of helping recover Western Turtle populations as part of Habitat Acquisition Trust's (HAT) Species At Risk Program. This report presents the results of wetland surveys, habitat enhancement, and stewardship activities carried out on Vancouver Island during the 2013 field season.

Distribution:

Adequate knowledge of distributions is an essential first step for conservation of species at risk. In 2013, we continued to fill in gaps in survey coverage in the CRD and Alberni Valley. We also worked with Cowichan Land Trust, immediately north of the CRD (Cobble Hill, Duncan, Shawnigan, and Cowichan Valley). During the 2013 field season, we surveyed 48 wetlands within the focal areas on Vancouver Island and spent a total of 49.6 person-hours searching for turtles on 53 survey occasions. We located the Western Painted Turtle at seven sites, two of which represent newly documented populations, one each in the Alberni Valley and Metchosin in the CRD. Of particular interest was the new Metchosin site, where we saw 25 Western Painted Turtles in a golf course pond during one visit. At another Metchosin pond where the presence of the species was confirmed in 2012, we saw ten individuals during a visit in 2013. These sites appear to support relatively large populations compared to other sites in the CRD. As part of this project, from 2008 – 2013, we have surveyed a total of 151 water bodies or wetlands for turtles. Western Painted Turtles have been documented at 17 of these sites; a few additional confirmed records exist from roads and residential properties. Introduced Sliders were widespread across the survey areas, particularly in populated parts of the CRD. No Western Painted Turtles were seen in the Cowichan Valley surveys.

During surveys of CRD Regional Parks in 2013, we found the Western Painted Turtle only at Elk-Beaver Lake Regional Park, which appears to support one of the largest known populations of the species in the CRD. During surveys in 2013, we did not locate the species in Matheson Lake, where it has been found previously, or in other regional parks surveyed.

Nesting habitat enhancement and monitoring:

During the 2013 field season, we monitored turtle nesting habitat at five sites that were previously enhanced or restored as part of this project (2 sites in Elk/Beaver Lake Regional Park referred to as East Pond and EBES sites; 1 site in Swan Lake and

Christmas Hill Nature Sanctuary; 1 site at a site referred to as Airport Wetlands, Alberni Valley) and expanded restoration activities at Swan Lake (2 new sites enhanced). At Elk-Beaver Lake, we engaged CRD Parks volunteers in site maintenance, consisting of weeding and removal of blackberry bushes, and directed habitat enhancement at one of the sites. At Swan Lake, an enhanced nesting area has received consistent but light use by turtles since its construction in 2010; one emerged nest was found there in May 2013. Two additional nesting areas were created in 2013 by sanctuary staff and volunteers to provide opportunities for turtles to nest over a wider area of the sanctuary.

In Elk-Beaver Lake Regional Park, we continued monitoring hatchling emergence from nests in spring 2013 by regularly inspecting the enhancement sites for emerged nest holes. At the East Pond communal nesting area, we found a total of 14 emerged nests, both within and outside the experimental enhancement plots within an area of approximately 10 m x 12 m. Hatchling emergence occurred from 28 March – 14 May 2013 with a peak in April. Of the 14 emerged nests, eight were within the 1 m² circular experimental plots that were either recently tilled, tilled in previous years, or unmanipulated reference plots. Of the eight nests, seven were within plots tilled in spring 2012 immediately prior to the egg-laying in June – July of that year (hatchlings over-winter in the nests). These results support previous observations that tilling is an effective habitat nesting enhancement method in grassy habitats. From 2011 – 2013, 73% of the emerged nests have been within the recently tilled plots.

At the East Pond site, nesting success, based on percentage of known nests from which at least one hatchling emerged, was lower than in previous years (26.3% in 2013 versus 46.2 – 77.8% from 2009 – 2012). This was largely due to flooding of the lower third of the site by beaver activity during the winter 2012 – 2013. Beaver activity creates ponds and shallow areas preferred by turtles, and hence it is expected to have an overall positive effect on turtles over the long term. CRD parks staff removed the dam and slowly let out the water over the course of spring and summer 2013 to clear popular recreational trails that were also affected by the flooding.

At Airport Wetlands in the Alberni Valley, we collaborated with Island Timberlands to enhance nesting habitat for turtles within private forestry lands and in 2011 constructed two sand dunes in an abandoned gravel pit; turtles were previously using this site for nesting but apparently with little success due to very hard rocky substrate. In May 2013, we found several emerged nests (egg laid in 2012) in the dunes, but unfortunately all had been predated. However, the presence of nests indicated that turtles were using the enhanced areas. We expect that the enhanced habitat will continue to improve as the dunes settle and the substrate compacts. Turtles continued to nest on a mound of hard substrate in the same gravel pit and also at a nearby site on an old spur road across a main logging road from the wetland. At the latter site, both adults and newly hatched young are potentially exposed to roadkill during their travels between the nesting area and the wetland.

Aquatic habitat enhancement:

In 2013, we continued previous efforts to provide basking sites for turtles in water bodies deemed to benefit from this activity. To enhance basking habitat, we have used several different kinds of structures, including mill-end slabs, logs or modified logs, and/or composite boards, designed by Camosun College students especially for turtles, in six water bodies (two ponds in Elk-Beaver Lake Regional Park, Swan Lake, Philippa Lake, Trevlac Pond, and a pond in Metchosin). Turtles readily and almost immediately used all these structures. In addition to helping turtles and facilitating surveys, basking structures provide viewing opportunities to visitors and increase their awareness of turtles as part of our native wildlife. In the January 2014, we installed 70 donated logs in Swan Lake, which we anticipate will benefit the turtles and other wildlife for many years.

In Elk-Beaver Lake Regional Park, exceptionally high water levels in both ponds with basking structures in winter – spring 2013 had compromised many of the boards, but we were able to reposition most of them. At the other sites, many of the slabs and composite boards installed in previous years had suffered from water-logging or dislodgment. We anticipate that actual logs will provide long-lasting basking opportunities for turtles but can be costly to acquire and install. Smaller structures, such as slabs and composite boards, provide a cost-effective solution for small ponds but may need replacement every few years.

Recommendations for 2014:

- Within the CRD, Alberni Valley, and Cowichan Valley, continue to fill in data gaps in survey coverage and follow up leads from anecdotal observations reported to HAT and Cowichan Land Trust by the public.
- At Elk-Beaver Lake Regional Park:
 - continue monitoring and maintaining enhanced nesting habitat at the East Pond and equestrian grounds sites
 - consider controlling bullfrogs in ponds adjacent to Western Painted Turtle nesting sites
 - continue monitoring the condition of existing basking structures and install larger logs that are more permanent than the smaller structures used to date
- At Swan Lake and Christmas Hill Nature Sanctuary:
 - maintain and control vegetation growth in enhanced nesting areas and monitor their use by turtles
 - monitor use and condition of previously installed basking logs
 - implement other specific habitat enhancement and threat mitigation recommended in the turtle management guidelines for the site
- At Airport Wetlands:
 - continue monitoring the condition and use of enhanced turtle nesting habitat

- use time-lapse cameras to monitor the use of identified nesting areas and migration route across a main logging road at this relatively remote site.
- Explore opportunities to install basking structures to additional sites where turtles are deemed to benefit from this action and where educational opportunities are enhanced by increased visibility of turtles to visitors.
- Continue working with existing habitat stewards, including large landowners and managers who have collaborated in habitat enhancement and threat mitigation projects as part of this study.

Table of Contents:

Acknowledgments	2
Executive Summary	3
1.0 Introduction	9
2.0 Goal and Objectives	9
3.0 Approach and Methods	10
3.1 Distribution and threat assessment.....	10
3.2 Nesting habitat enhancement	10
3.3 Aquatic habitat enhancement	11
4.0 Results.....	12
4.1 Distribution and threat assessment.....	12
4.1.1 Overview of surveys	12
4.1.2 Capital Regional District	18
4.1.3 Alberni Valley	18
4.1.4 Cowichan Valley and surroundings	19
4.1.5 Threat assessment and priority actions.....	19
4.2 Nesting ground monitoring and restoration	24
4.2.1 Elk/Beaver Lake Regional Park.....	24
4.2.2. Swan Lake and Christmas Hill Nature Sanctuary and Capital City Allotment Gardens	29
4.2.3. Alberni Valley	31
5.0 Enhancement of Aquatic Habitat	32
5.1 Elk-Beaver Lake Regional Park	32
5.2 Swan Lake-Christmas Hill Nature Sanctuary	32
5.3 Other sites	34
6.0 Discussion.....	35
6.1 Distribution and threats	35
6.2 Nesting Habitat Enhancement	36
6.3 Aquatic Habitat Enhancement	38
7.0 Recommendations	40
8.0 Literature Cited	41

List of Tables

Table 1. Summary of water bodies searched for turtles on Vancouver Island in 2013..	12
Table 2. Conditions and results of surveys conducted from April – October 2013.	12
Table 3. Assessment of main threats and priority actions for sites where the Western Painted Turtle has been found during the course of this study, 2008 - 2013.....	21
Table 4. Nesting success at East Pond communal nesting area in Elk-Beaver Lake Regional Park, 2009 - 2013.....	26
Table 5. Summary of emerged nests found on experimental plots with different treatments in spring 2011 - 2013.....	28
Table 6. Summary of new nests found on experimental plots at the East Pond site in summer 2010 – 2012.....	28

List of Figures

Figure 1. Overview of Western Painted Turtle surveys on Vancouver Island, 2013. Arrows indicate new Western Painted Turtle sites found in 2013.	15
Figure 2. Summary of Western Painted Turtle observations and search effort associated with this project from 2008 – 2013. WPT – Western Painted Turtle.	16
Figure 3. Summary of Slider observations and search effort associated with this project from 2008 – 2013.	17
Figure 4. Seasonal turtle crossing sign at a potential road crossing problem area (photo by Todd Carnahan).....	20
Figure 5. Frequency distribution of monthly turtle hatchling emergence from nests at East Pond, Elk-Beaver Lake Regional Park, from 2009 to 2013.	25
Figure 6. Frequency distribution of number of females digging nests at East Pond, Elk-Beaver Lake Regional Park, from 2009 to 2012.	25
Figure 7. Communal turtle nesting area at East Pond, Elk-Beaver Lake Regional Park, showing the location of experimental habitat enhancement plots (1 m ² diameter circles) and emerged Western Painted Turtle nests from 2009 – 2013. The light gray area indicates flooding in winter – spring 2013.....	26
Figure 8. Locations of emerged nests found at the experimental nesting habitat enhancement site by East Pond in spring 2013.....	27
Figure 9: Location of restored and enhanced Western Painted Turtle nesting sites at Swan Lake.....	30
Figure 10: A Western Painted Turtle laying eggs at a restored nesting area at Swan Lake (photo by Burl Jantzen).....	31
Figure 11. Turtle basking logs waiting transportation to Swan Lake, January 2014.	33
Figure 12. Logging arch used to transport logs site to Swan Lake.....	33
Figure 13. Logs awaiting installation in Swan Lake.....	34

List of Appendices

Appendix 1. Poster prepared for Capital City Allotment Gardens.....	42
---	----

1.0 Introduction

The endangered Pacific Coast Population of the Western Painted Turtle (*Chrysemys picta bellii*) occurs in southwestern British Columbia, where its range overlaps with landscapes that are heavily modified by residential and agricultural developments, road building, and forestry (COSEWIC 2006). Much of the distribution of the turtles is on private lands, and stewardship by landowners and managers is essential to conserve the species.

This report presents the results of wetland surveys, habitat enhancement, and stewardship activities carried out on Vancouver Island during the 2013 field season, continuing work from previous years. This study is part of a broader program by the Habitat Acquisition Trust (HAT), which focuses on protecting species at risk and their habitats through community involvement and partnerships with landowners. HAT included the Western Painted Turtle as a focal species in 2008 (Engelstoft and Ovaska 2008), and studies have been conducted annually since then (Ovaska and Engelstoft 2009, 2010, 2012, Engelstoft and Ovaska 2011, 2013).

Partners of the project include the Capital Regional District (CRD) Regional Parks, Swan Lake and Christmas Hill Nature Sanctuary, Island Timberlands, and other private landowners/managers. The project represents the final year of a 3-year project funded by Environment Canada's Habitat Stewardship Program, with supporting funding from CRD Parks for turtle studies in CRD Regional Parks. Turtle surveys in the Cowichan Valley are presented here for completeness and were conducted by one of us (C. Engelstoft) in collaboration with the Cowichan Land Trust with funding from a separate HSP grant.

2.0 Goal and Objectives

The overall goal of the project is to help the recovery of Western Painted Turtle populations on Vancouver Island and the Gulf Islands by conducting surveys and habitat enhancement activities, and engaging landowners and community members in stewardship.

The objectives were as follows:

1. Conduct surveys for the Western Painted Turtle to clarify its distribution and to assess threats in focal areas within CRD, and Cowichan and Alberni Valley.
2. Continue enhancement and monitoring of nesting areas.
3. Continue enhancement of aquatic habitats by installing basking structures and monitoring their effectiveness.
4. Involve landowners, managers, and community members in stewardship activities.

3.0 Approach and Methods

3.1 Distribution and threat assessment

The distribution of the Western Painted Turtle on Vancouver Island is incompletely known, hindering conservation efforts. The focus of the surveys in 2013 was to fill in data gaps within the focal areas in CRD and Alberni Valley. We also worked with the Cowichan Land Trust at Cobble Hill, Duncan, and Shawnigan areas, immediately north of the CRD to increase survey coverage.

We identified wetlands for surveys from orthophotos within the focal areas and followed tips of turtle sightings from naturalists, residents, and the public. The survey protocol was as in previous years (Engelstoft and Ovaska 2008, 2011, 2013): One or more observers visually searched for basking or swimming turtles either from a boat or from vantage points on land using binoculars and/or a spotting scope, as appropriate. We timed each survey to quantify the search effort and collected information on weather conditions, such as air and water temperature, percentage of cloud cover, and precipitation.

As in previous years, we described the habitat during the first visit to each site (Engelstoft and Ovaska 2011). At sites where the Western Painted Turtle was found, we assessed potential threats from the following sources: roads (paved or unpaved); recreation (motorized or non-motorized); pets; exotic species (bullfrogs and alien turtle species); residential or other development; urban activities; agriculture; forestry; grazing; water withdrawal; other sources.

3.2 Nesting habitat enhancement

The availability of suitable, safe nesting areas is a limiting resource for Western Painted Turtle populations in many areas, and nesting areas appear to be in short supply at most of the known sites on Vancouver Island. During the 2013 field season, we monitored nesting habitat at five sites that were previously enhanced or restored as part of this project (Engelstoft and Ovaska 2011, 2013; Ovaska and Engelstoft 2012) and expanded restoration activities at one of these sites. Two sites were in Elk/Beaver Lake Regional Park (East Pond site: enhanced yearly from 2010 – 2012; EBES - Equestrian grounds site: enhanced in 2011), one site was in Swan Lake and Christmas Hill Nature Sanctuary (enhanced in 2010), and one site was at Airport Wetlands in Alberni Valley (enhanced in 2011). With help from CRD Parks volunteers, additional enhancement and maintenance activities were conducted in May 2013 at the two nesting areas in Elk-Beaver Lake Regional Park. Two additional sites were enhanced at Swan Lake in spring 2013 by Swan Lake staff according to a plan we had provided to the sanctuary.

At Elk/Beaver Lake Regional Park, we visited the nesting areas regularly during the period when hatchlings emerged in spring, and used a time-lapse camera to record turtle activity during the egg-laying period in summer at both enhancement sites. At the East Pond site, the camera (Primos® DPS Model No 63070; set to take an image every

30 s) was on a 3 m-tall pole, as in 2012 (Engelstoft and Ovaska 2013). At the EBES site, the camera (Wingscapes®; set to take an image every 10 min) was placed in a nearby tree with a view of most of the enhancement area. In the Alberni Valley, we inspected the enhanced nesting area and its surroundings twice in 2013 with help from local naturalists Rick and Libby Avis. A time-lapse camera (Wingscapes®; set to take an image every 10 minutes) was placed in a tree to record turtle activity at the enhancement site; a second camera was similarly placed with a view of a nearby previously identified nesting area on an old spur road. All cameras were tilted down towards the ground and placed in wooden boxes resembling bird nest-boxes to discourage vandalism. At Swan Lake, we mostly relied on staff, interns, and visitors to report turtle nesting activities.

3.3 Aquatic habitat enhancement

Turtles bask in the sun to elevate their body temperature; basking aids digestion and other vital processes (COSEWIC 2006). In 2013, we continued previous efforts to provide basking sites for turtles in water bodies where basking opportunities were deemed to be limited. The activities consisted of installing basking logs in Swan Lake and monitoring the condition and restoration of structures that were installed in 2010 – 2012 as part of this project at six sites: Elk-Beaver Lake Regional Park (two sites), Swan Lake, Philippa Lake, Trevlac Pond, and a pond in Metchosin (Ovaska and Engelstoft 2010, 2012; Engelstoft and Ovaska 2011, 2013). Use of the installed basking structures by turtles has been demonstrated in previous years, but their continued functionality across years requires monitoring and replacement, as needed.

4.0 Results

4.1 Distribution and threat assessment

4.1.1 Overview of surveys

In 2013, we surveyed 48 wetlands for turtles on Vancouver Island. Of these, 26 were surveyed for the first time, while the remaining surveys were revisits (Table 1). In total, we spent 49.6 person-hours searching for turtles during 53 survey occasions. The surveys were conducted from 22 April to 9 October, with most of the surveys in April – May when turtles are often detected readily when basking on logs or along the shoreline. Air temperatures ranged from 14 to 32° C (mean = 17°C; Standard Deviation = 4°C; Table 2). Most of the surveys were conducted from vantage points on the shore, but some were from a boat or by swimming. They generally took place in the late morning or afternoon.

Table 1. Summary of water bodies searched for turtles on Vancouver Island in 2013.

Area	NGO*	# of surveyed sites (new sites)	# of surveys	Survey time (person- hours)
Alberni Valley	HAT	13 (8)	14	14.3
Capital Region District	HAT	23 (9)	27	25.0
Cobble Hill	HAT	4 (3)	4	3.2
Cowichan area	CLT	8 (6)	8	7.2
Total		48 (26)	53	49.6

* HAT = Habitat Acquisition Trust, CLT = Cowichan Land Trust

We located the Western Painted Turtle at seven sites, two of which represent newly documented populations, from Alberni Valley and from Metchosin within CRD (Figure 1). Residents reported the Western Painted Turtle from one additional site in each area and submitted images, from which the species identity was confirmed. Introduced Sliders (*Trachemys scripta*) were detected at 14 sites (Table 1).

As part of this project, from 2008 – 2013, we have surveyed a total of 151 water bodies or wetlands, including the eight water bodies for Cowichan Land Trust shown in Tables 1 and 2. The Western Painted Turtle has been documented at 17 of these sites (Figure 2). There are a few additional confirmed records of Western Painted Turtles from the focal areas as reported by residents or the public or observed on roads. Sliders were recorded in water bodies throughout the areas surveyed (Figure 3).

Table 2. Conditions and results of surveys conducted from April – October 2013.

Area and site	Date	Start time	Person-min	Air temp °C	Cloud cover (%)	Survey method	Western Painted Turtle #	Red-eared Slider #
Alberni Valley:								
Airport Wetlands	31-May-13	12:00	120	15	>50	Foot	23	0
Ash Main, Pond 1	31-May-13	13:15	15	15	>50	Foot	0	0
Ash Main, Pond 4	31-May-13	13:40	60	15	>50	Foot	0	0
Ash Main, pond at 26 km mark	31-May-13	12:40	120	15	>50	Foot	4	0
Bainbridge Lake	30-May-13	19:45	60	14	>50	Foot	0	0
Burde St Pond (lower)	31-May-13	14:40	30	15	>50	Foot	0	0
Burde St Pond (upper)	31-May-13	16:50	20	15	>50	Foot	0	0
Burde St ponds	9-Jun-13		90		Clear	Foot	0	0
Round Lake	31-May-13	14:35	60	16	>50	Foot	0	0
Summit Lake (slough)	30-May-13	15:15	30	14	100	Foot	0*	0
Tilley Drive pond	31-May-13	15:40	40	17	>50	Foot	0	0
Tilley Drive pond	9-Jun-13		60		Sunny	Foot	0	1
Ward Lake	9-Jun-13		90		Sunny	Foot	0	0
Pacific Rim HWY, W of Sproat Lk.	9-Jun-13		60		Clear	Foot	0	0
Capital Regional District (CRD):								
<i>CRD Regional Parks:</i>								
Killarney Lake	16-Aug-13	15:05	90	25	50	Swim	0	1
Matheson Lake	22-Apr-13	15:30	60	15		Foot	0	4
Matheson Lake	16-Apr-13	16:30	60	14	0	Foot	0	0
Pease Lake	11-Jul-13	16:30	30			Swim	0	0
Thetis Lake	17-Aug-13	16:35	55	23	>50%	Foot	0	0
<i>Other areas in CRD:</i>								
Beacon Hill Park	23-Apr-13	15:30	5	17	0	Foot	0	17
Blenkinshop Lake	24-Apr-13	11:25	60	17	0	Boat	0	0
Eagles Lake	20-Jun-13	10:15	30	15	1	Foot	0	0
Eagles Lake	3-May-13	14:30	10			Foot	0	0
Eagles Lake	4-Jul-13	8:40	20	15	Clear	Foot	0	0
Eagles Lake	4-Jul-13	12:15	10		Clear	Foot	0	1
Florence Lake	22-Apr-13	10:50	80	14	0	Foot	1	1
Glen Lake	22-Apr-13	12:15	50	15	0	Foot	0	6
Glinz Lake	27-Apr-13	14:00	90		100	Foot	0	0
Heritage Acres	4-Jul-13	12:00	40	20	<50%	Foot	0	4
Metchosin pond 1 (WR)	22-Apr-13	15:00	30	17	0	Foot	1	1
Metchosin pond 2 (OG)	22-Apr-13	13:00	120	17	0	Foot	25	2
Metchosin pond 3 (LR)	22-Apr-13	14:20	10	17	0	Foot	0	0
Metchosin pond 4 (BG)	16-Apr-13	15:25	60	14	0	Foot	10	0
Philippa (Little Maltby) Lake	4-Jul-13	7:45	20	15	Clear	Foot	0	0
Prospect Lake	2-Jul-13	9:00	160	20	0	Boat	0	1
Prospect L Golf Course	9-Jul-13	13:30	60	26	Clear	Foot	0	1
Second Lake	3-May-13	13:30	135			Foot	0	0*
Spencer Pond	22-Apr-13	11:40	40	15	0	Foot	0	0

Area and site	Date	Start time	Person-min	Air temp °C	Cloud cover (%)	Survey method	Western Painted Turtle #	Red-eared Slider #
Trevlac Pond	4-Jul-13	8:00	40	15	Clear	Foot	0	0
Van der Meer Pond (Camosun College)	12-Jul-13	10:20	15	18	Clear	Foot	0	0
Woodridge Pond 2	4-Jul-13	9:00	120	16	Clear	Foot	1	0
Cobble Hill:								
Dougal Lake & side pond	10-Jun-13	13:50	30	20	<50	Foot	0	1
Kinsol Trestle pond	10-Jun-13	12:15	60	17	<50	Foot	0	2
Shawnigan Lake, south end	10-Jun-13	15:40	60	20	>50	Boat	0	0
Spectacle Lake	10-Jun-13	10:25	40	13	>50	Foot	0	0
Cowichan area:								
Crofton Lake	13-Oct-13	12:16	110			Foot	0	0
Heron's Wood Pond	11-Sep-13	12:00	20		0	Foot	0	0
HYW Scales Pond	11-Sep-13	15:00	30		0	Foot	0	0
Mayo Lake	11-Sep-13	10:00	150	19	0	Foot	0	0
Mays Rd, Pond 1	1-Oct-13	14:05	10			Foot	0	0
Mays Rd, Pond 2	1-Oct-13	14:15	10			Foot	0	0
Pond by Forestry Center	11-Sep-13	13:55	40	32	0	Foot	0	1
Wake Lake	11-Sep-13	11:50	60	26	0	Foot	0	0

* Photo of Western Painted Turtle submitted by visitor to the lake

Figure 1. Overview of Western Painted Turtle surveys on Vancouver Island, 2013. Arrows indicate new Western Painted Turtle sites found in 2013.

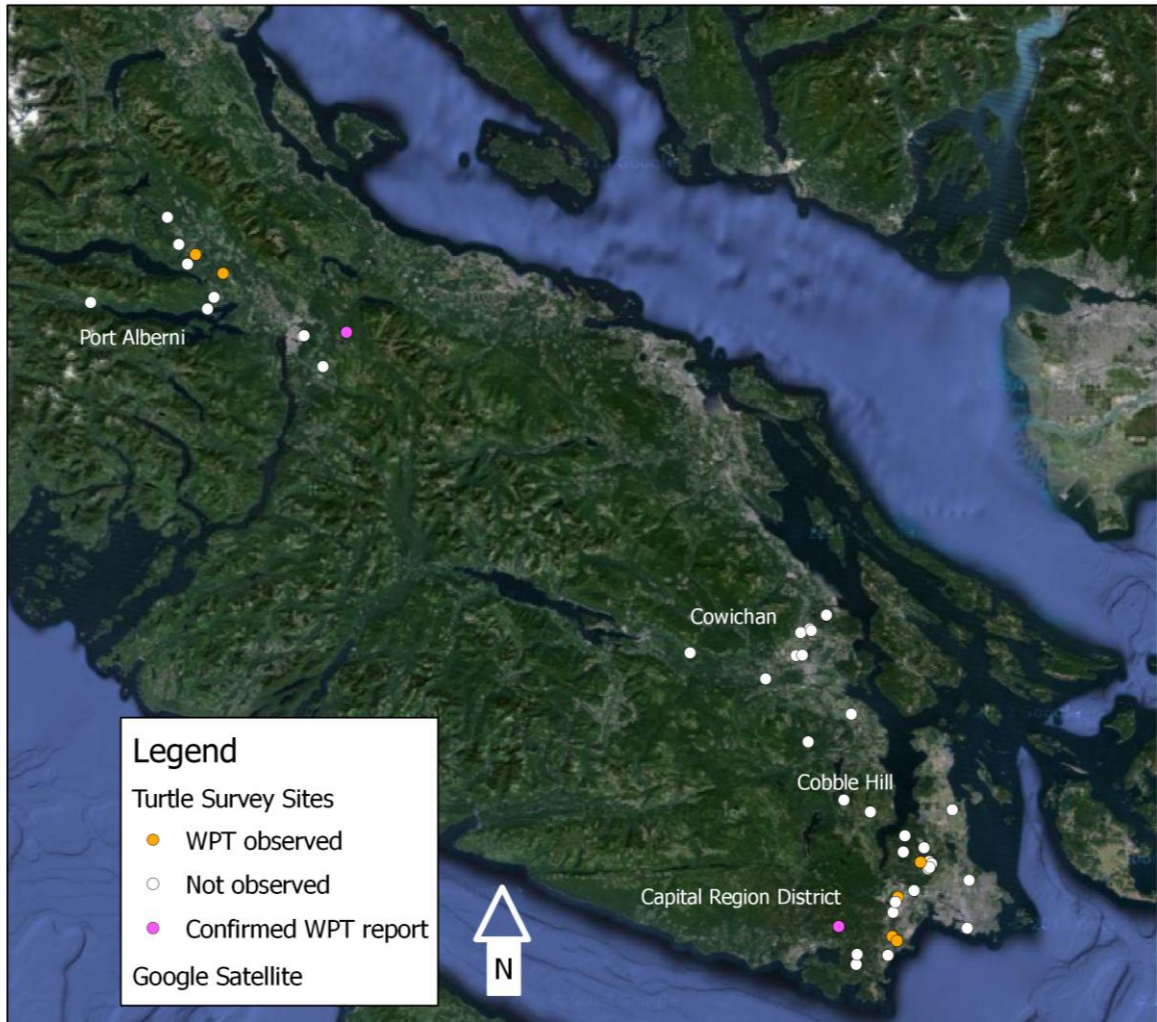


Figure 2. Summary of Western Painted Turtle observations and search effort associated with this project from 2008 – 2013. WPT – Western Painted Turtle.

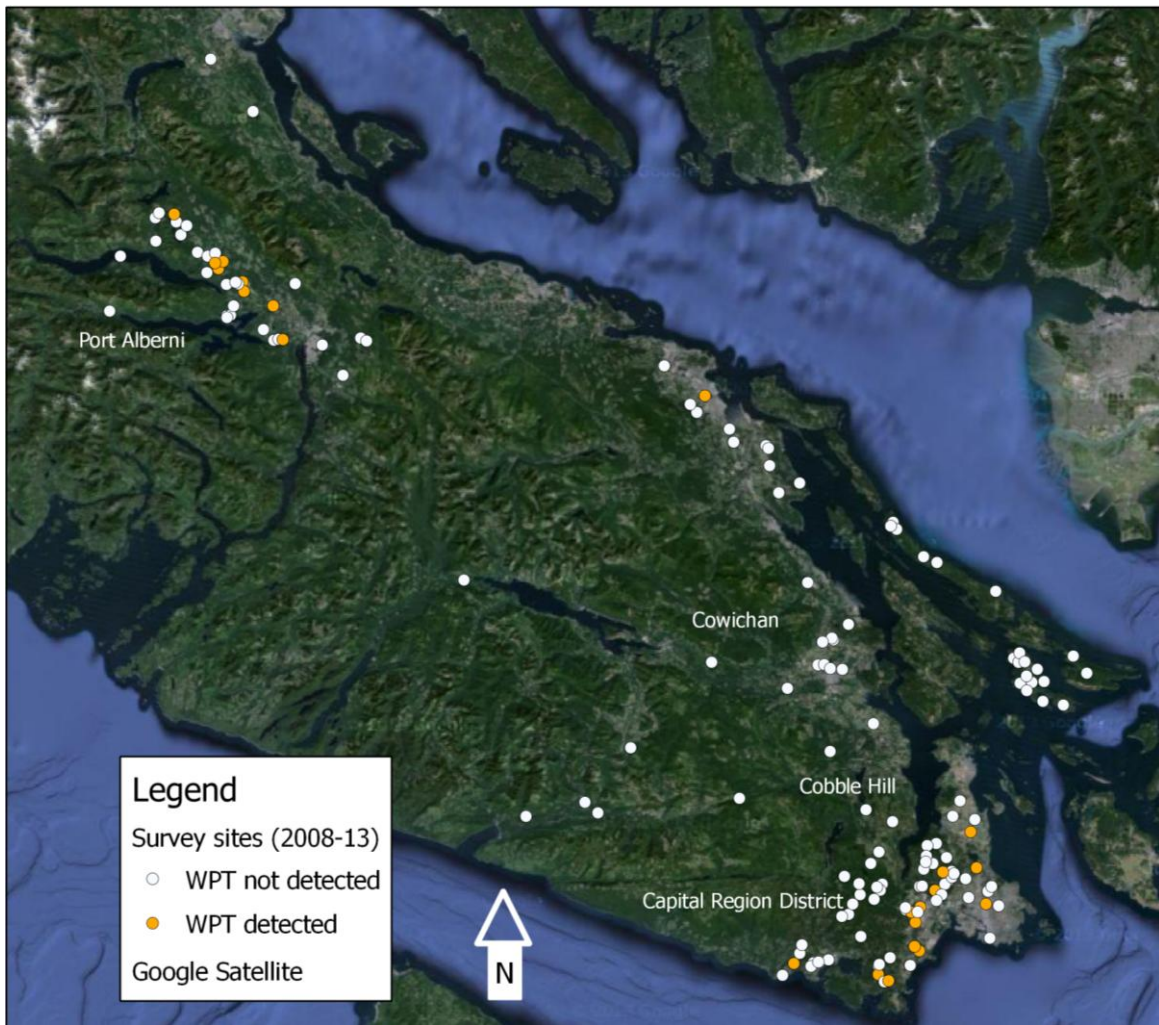
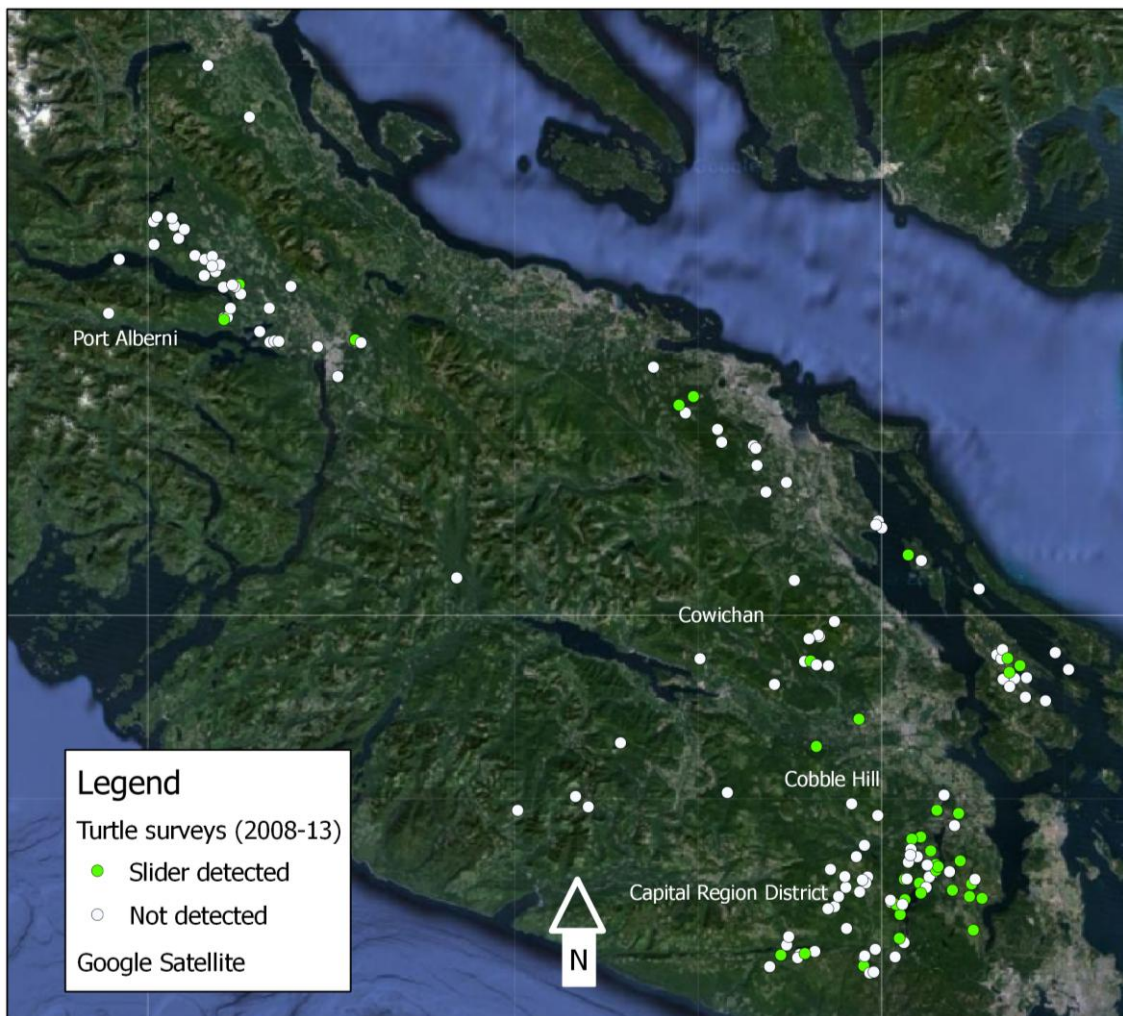


Figure 3. Summary of Slider observations and search effort associated with this project from 2008 – 2013.



4.1.2 Capital Regional District

In the CRD, we surveyed a total of 23 wetlands, nine of which were visited for the first time in 2013 (Table 2). The Western Painted Turtle was documented from two new sites: in Metchosin, based on above surveys, and in Sooke, based on a landowner report supported by photographs. In addition, new information on abundance was obtained for another site in Metchosin. The new site on the grounds of a Metchosin golf course was identified following tips from landowners and the public and appears to support a relatively large Western Painted Turtle population; we observed 25 turtles of different sizes basking on a log in a small pond at this site in spring 2013. Also in spring 2013, we found ten adult Western Painted Turtles at another Metchosin site, which was first brought to our attention in 2012. An observation of a Western Painted Turtle laying eggs in a private yard near Sooke was reported to us and confirmed from photographs. There are previous records of the species from one site in Sooke, Kemp Lake, but surveys of several other water bodies in the area have so far failed to detect the species. The new observation near McKenzie Lake suggests that the record from Kemp Lake is not an isolated incidence and that the turtles may be more widespread in the Sooke area.

During a revisit to Eagles Lake in the Highlands area, we were shown by a resident a nearby private pond, where we observed a young juvenile Western Painted Turtle basking along the pond edge; the residents reported regular observations of adult turtles in the pond. Although probably part of the Eagles Lake population and not a new site, this observation expands our knowledge of the extent of the turtles' habitat use in the area.

During the surveys, we frequently encountered introduced sliders (Table 2). In addition, the Mississippi Map Turtle (*Graptemys pseudogeographica*), another introduced species, was found at two sites (Prospect Lake and Beaconhill Park).

CRD Regional Parks: In 2013, we continued surveys of water bodies in CRD Regional Parks, and revisited four park areas (Table 2). The Western Painted Turtle has been confirmed from one of these sites (Matheson Lake) but was not found there during two surveys in 2013. In contrast, we regularly observed Western Painted Turtles in the Elk/Beaver Lake Regional Park, where we carried out turtle nesting and basking habitat enhancement activities (see Sections 4.2.1 and 5.1).

4.1.3 Alberni Valley

In the Alberni Valley, with assistance from local naturalists Rick and Libby Avis, we surveyed a total of 13 wetlands, eight of which were visited for the first time in 2013 (Table 2). The Western Painted Turtle was documented from two new sites, from a wetland along Ash Main and from Summit Lake. Both sites were found with volunteer help. Following a tip from foresters, we visited the wetland along Ash Main, where we observed two juvenile Western Painted Turtles. At Summit Lake, a visitor provided us with a photograph of a Western Painted Turtle taken a few weeks after we had visited

the site without finding the species. We encountered introduced Red-eared Sliders at only one of the sites surveyed in 2013. No other introduced turtles were found.

4.1.4 Cowichan Valley and surroundings

From 11 September – 13 October 2013, we searched and assessed eight water bodies for turtles in the Cowichan area in collaboration with the Cowichan Land Trust. Only one turtle, a Red-eared Slider, was found during the surveys. Because of the lateness of the season, the primary focus of the surveys was on habitat assessment.

4.1.5 Threat assessment and priority actions

In the CRD, one of the new sites is within a golf course, and turtles may be subjected to disturbance from maintenance or visitor activities when nesting or travelling across the landscape. The other new site landowner report from Sooke is within a private residential property in an area where roadkill might be a threat, but as of March 2013, we have not yet inspected the site.

In the Alberni Valley, one of the new sites, wetland along Ash Main, is immediately adjacent to a main gravel logging road. Signs of turtle nesting activity (“test” holes) were found on the road shoulder on the opposite side of the road from the wetland, suggesting that turtles cross the road and nest in unsafe areas where they are subjected to roadkill. No threats were identified at the other new site at Summit Lake, which is away from roads.

In 2013, HAT staff and landowners continued to install turtle crossing signs at sites where turtles were likely to cross busy roads (Figure 4). During the 2013 field season, HAT received no reports of roadkill turtles, but there was one report of a turtle attempting to nest along the side of Robinson Road in Sooke. Such occurrences may be common but undocumented in areas where nesting sites are in short supply, as appears to be the case within much of Vancouver Island. In Saanich, a tagged female turtle crossed the 4-lane Patricia Bay Highway in early May 2013 from Swan Lake to Capital City Allotment gardens, where it then nested. This turtle made the same trek in spring 2012, returning to Swan Lake after nesting. This turtle most likely travelled through a long (approximately 150 m) culvert under the highway, as it would be unlikely for a turtle to survive crossing the busy highway. An anecdotal report exists of a turtle by the highway edge at this location (Engelstoft and Ovaska 2013), but we know of no observations of roadkill.

Main threats and suggested priority actions to restore populations of the Western Painted Turtle found during the course of this study are presented in Table 3. Depending on site-specific conditions, the actions consist of varying combinations of surveys, mark-recapture and telemetry studies, collection of genetic samples, mitigation of roadkill, and restoration of nesting and aquatic habitats. While some sites require more survey effort, other sites that are better known would benefit from habitat restoration/enhancement and/or detailed population studies.

Figure 4. Seasonal turtle crossing sign at a potential road crossing problem area (photo by Todd Carnahan).



Table 3. Assessment of main threats and priority actions for sites where the Western Painted Turtle has been found during the course of this study, 2008 - 2013.

Location	# of visits	# years with visits	Latest visit	Red- eared Slider found	Largest # WPT found at one time	Nesting site(s) found	Juveniles found	Habitat restoration initiated	Main threats	Priority actions
Alberni Valley:										
Ash Main, pond at 26 km mark	1	1	2013	NO	2	No	Yes	No	Roadkill	Spring/early summer surveys for turtles & evidence of breeding; roadkill mitigation
Turnbull Lake	1	1	2010	NO	5	No	Yes	No	Roadkill	More surveys in entire area; roadkill mitigation; collection of genetic samples
Airport Wetlands	12	6	2013	YES	56	Yes	Yes	Nesting: ongoing	Roadkill	Nesting habitat restoration & monitoring (continued); mark-recapture study
Devil's Den Lake	3	3	2010	NO	10	Yes	No	No	None identified in immediate vicinity	Collection of genetic samples (to date available from only 1 Alberni site); nesting habitat restoration?
Little Turtle Lake	5	3	2010	NO	2	No	No	No	Roadkill	More surveys of entire lake
Sumner Lake	4	3	2012	NO	9	No	No	No	Recreation (to nesting area)? Roadkill?	Collection of genetic samples; surveys for nesting sites
Summit Lake (slough)	1	1	2013	NO	2	No	No	No	None identified	Collection of genetic samples (in between 2 putative conservation units); more surveys
Patterson Lake	2	2	2009	NO	1	Yes	No	No	Ingrowth of vegetation?	More surveys

Location	# of visits	# years with visits	Latest visit	Red- eared Slider found	Largest # WPT found at one time	Nesting site(s) found	Juveniles found	Habitat restoration initiated	Main threats	Priority actions
McKenzie Slough, Stamp River	1	1	2011	NO	4	No	No	No	None identified in immediate vicinity	More surveys
Capital Regional District:										
Adam Kerr Pond	3	3		NO	1	No	No	No	Roadkill, urban activities; transient/ travel route	Surveys up & down the stream; habitat restoration, if more turtles are found
Eagles Lake & associated ponds	4	3	2013	YES	2	Yes	No	Planned; some taken place	Roadkill; hydrology changes (potential beaver control)	Nesting & aquatic habitat restoration
Langford Lake	7	5	2012	YES	27	Yes but only on lawns	Yes (but no very small ones)	No	Housing development, urban activities, (non-motorized boating), mechanized aquatic weed removal	Collection of genetic samples; mark-recapture study; landholder contacts; habitat restoration
Florence Lake	6	4	2013	YES	2	No	No	No	Urban activities	Landholder contacts on shoreline properties
Glen Lake	4	4	2013	YES	3	No	No	No	Urban activities (non-motorized boating)	Landholder contacts on shoreline properties
Olympic View Golf Course	1	1	2013	NO	25	No	Yes	No	Golf course maintenance, including nest disturbance	Collection of genetic samples; mark-recapture study; telemetry; habitat restoration
Metchosin Pond (10)	1	1	2013	NO	10	No	No	Yes (basking log)	None identified but may be seasonally important for metapopulation	Collection of genetic samples; telemetry; habitat restoration

Location	# of visits	# years with visits	Latest visit	Red-eared Slider found	Largest # WPT found at one time	Nesting site(s) found	Juveniles found	Habitat restoration initiated	Main threats	Priority actions
Matheson Lake	10	7	2013	YES	3	Yes	No	No	Recreation (to nesting area); disturbance from non-motorized boating?	Monitoring of identified nesting site to find out species of turtle & continued use; surveys in early spring to determine if used as hibernation site
Metchosin, private pond	3	3	2013	YES	1	Yes	No	Yes (nesting)	Roadkill	Landholders will continue monitoring
Elk/Beaver Lake	21	4	2012	YES	34	Yes	Yes	Yes (nesting; addition of basking logs: both at Beaver Ponds)	Recreational activities (nesting, aquatic); motor boats; roadkill	Habitat restoration & monitoring (continued); mark-recapture study
Swan Lake	12	3	2011	YES	11	Yes	Yes	Yes (nesting, basking)	Roadkill at landscape level; lake is protected	Habitat restoration & monitoring (continued); landscape level monitoring of movements & nesting sites
Kemp Lake	4	3	2012	YES	1	No	No	No	Urban & recreational activity; some as community watershed	More surveys
McKenzie Lake	4	2	2010	YES	4	Yes	No	No	None identified; partially protected with CRD park; partially private land	Continue landholder contacts

4.2 Nesting ground monitoring and restoration

4.2.1 Elk/Beaver Lake Regional Park

East Pond nesting area

Turtles nest communally by a small pond (referred to as East Pond) within an area of approximately 10 m x 12 m. The nesting area was fenced in 2011 by CRD Parks to prevent inadvertent disturbance to nesting turtles and emerging hatchlings by park visitors and their dogs. In spring 2010, we began to investigate the effectiveness of tilling as a method for nesting habitat enhancement at this site, where encroachment by grasses and weeds was identified as a problem. Habitat enhancement consisted of experimentally tilling small (1 m²) circular plots. The experimental plots were in four rows of three plots. One plot from each row was tilled each year from 2010 to 2013, its position rotating among the years. The previously tilled plots were left undisturbed and quickly started to fill up with vegetation. In late May 2013, we tilled one plot per row, as per the rotation schedule, with the exception of the plot in the row closest to the pond, which was flooded.

In spring 2013, we found a total of 14 emerged nests, both within and outside the experimental plots, within the fenced area at East Pond. Emergence occurred from 28 March – 14 May 2013 with a peak in April (Figure 4). Hatchlings overwintered in the nests and were from eggs laid the previous summer. Beaver activity flooded the lower portion of the nesting area closest to the pond sometime over the winter, and the area remained flooded until early summer. Consequently, all emerged nests found in 2013 were in the upper portion of the nesting area. It is unclear whether hatchlings in the flooded nests died or simply emerged early. The timing of egg-laying at East Pond occurred from May to July from 2008 – 2012 (Figure 5). In 2013 the nesting area was monitored by a time-lapse camera, which unfortunately failed; therefore, data for this year are lacking from Figure 5. In spring 2014, we continued monitoring the site for emerged nests. As of 31 March, hatchlings have emerged from two nests. Continued monitoring is planned for April – May 2014.

An overview of the nesting area and the lay-out of the habitat enhancement plots are shown in Figure 6. Examination of the pattern of emerged nests since 2009 shows that most are clustered in the western portion of the nesting area and that the area furthest from the pond edge has received little use. In previous years, hatchlings emerged from many nests closest to the pond edge within the area that was flooded in spring 2013.

Figure 5. Frequency distribution of monthly turtle hatchling emergence from nests at East Pond, Elk-Beaver Lake Regional Park, from 2009 to 2013.

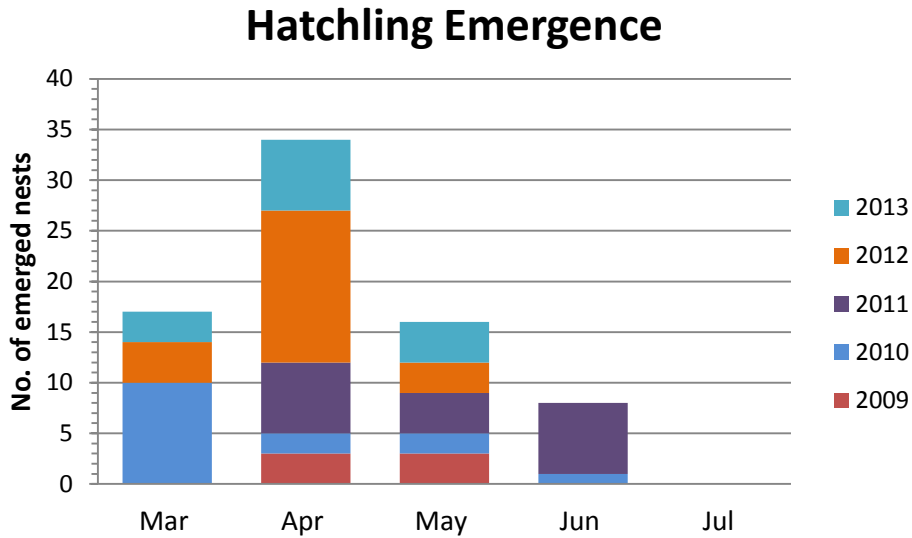


Figure 6. Frequency distribution of number of females digging nests at East Pond, Elk-Beaver Lake Regional Park, from 2009 to 2012.

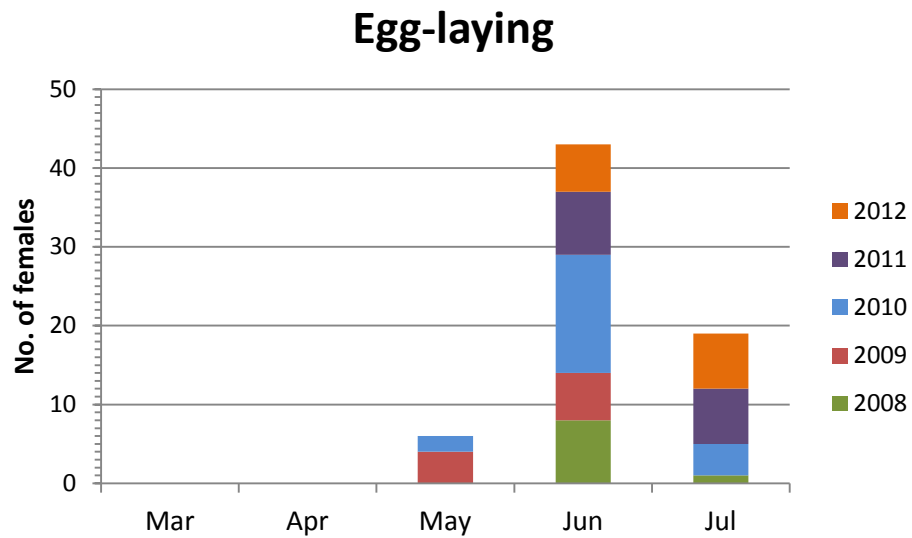
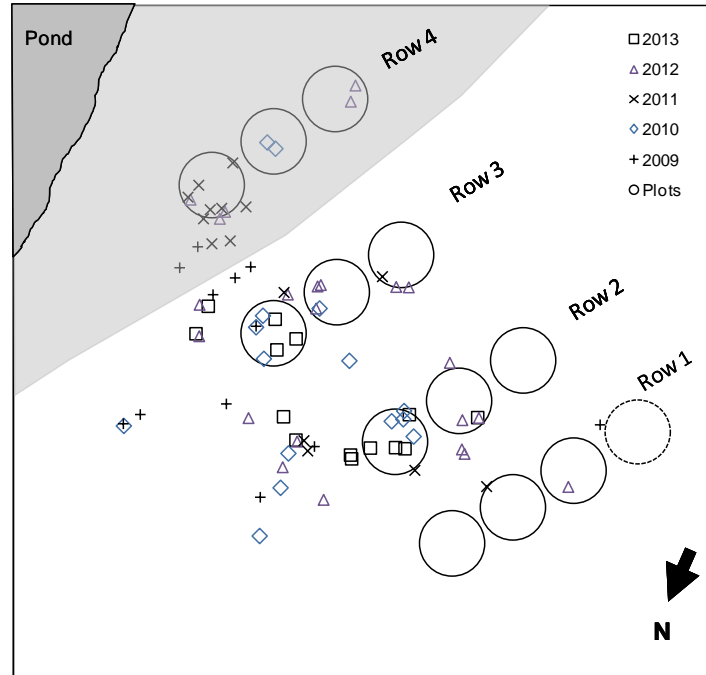


Figure 7. Communal turtle nesting area at East Pond, Elk-Beaver Lake Regional Park, showing the location of experimental habitat enhancement plots (1 m² diameter circles) and emerged Western Painted Turtle nests from 2009 – 2013. The light gray area indicates flooding in winter – spring 2013.

Note that the experimental treatments (not shown) within the plots rotated among the years.



Nesting success was calculated as the percentage of known nests from which at least one hatchling emerged. At only 26.3%, it was lower in spring 2013 than in previous years (Table 4), most likely reflecting the flooding of the lower portion of the study area.

Table 4. Nesting success at East Pond communal nesting area in Elk-Beaver Lake Regional Park, 2009 - 2013.

Note: Emergence occurs in spring of the year following egg-laying; follow shaded cells diagonally downwards to calculate hatching success (shown in Column 4).

Year	# new nests (with eggs) found	# emerged nests known from previous year	% nests emerged	Total # emerged nests found
2008	10	NA	NA	4*
2009	9	5	50.0	14
2010	19	7	77.8	15
2011	13	12	63.2	15
2012	12	6	46.2	23
2013	-	5	26.3	14

*Under-estimate; found late in the spring on 19 June

In spring 2013, eight of the 14 emerged nests found at the East Pond site were within the experimental plots. Seven of these were on the plots that were tilled in 2012, the year when the eggs were laid, and one was in a plot tilled the year before (Figure 8).

During the course of the experiment, from 2011 – 2013, we have observed 33 emerged nests on the experimental plots at the East Pond site. Of these, 73% were within the recently tilled plots (Table 5). Correspondingly, of the total of 32 newly dug nests on the plots 78% were within the recently tilled plots (Table 6).

Figure 8. Locations of emerged nests found at the experimental nesting habitat enhancement site by East Pond in spring 2013.

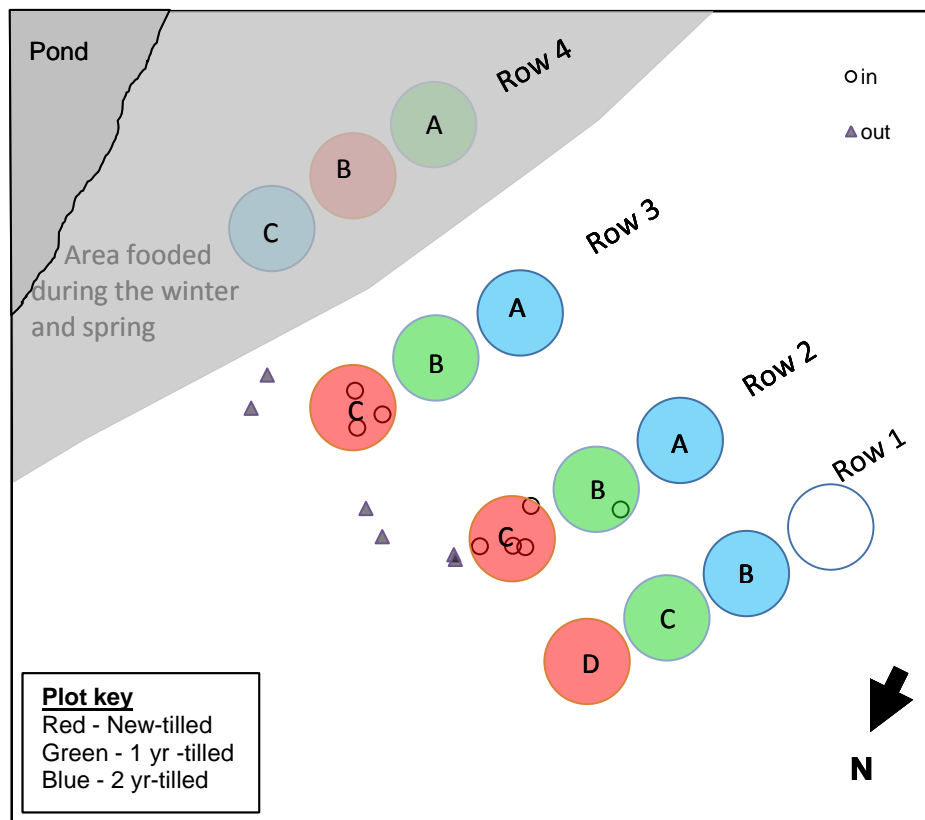


Table 5. Summary of emerged nests found on experimental plots with different treatments in spring 2011 - 2013.

Treatment	2011	2012	2013	Total	% of total
Tilled in previous spring	8	9	7	24	73
Tilled 2 yr prior	0	5	1	6	18
Tilled 3 yr's prior or control	2	1	0	3	9
Total	10	15	8	33	100

Table 6. Summary of new nests found on experimental plots at the East Pond site in summer 2010 – 2012.

Treatment	2010	2011	2012	Total	% of total
Tilled in spring of same year	6	9	10	25	78
Tilled 1 yr ago or previously used by turtles in 2010*	3	0	1	4	12.5
Tilled 2 yrs ago or in 2010 control**	1	2	0	3	9.5
Total	10	11	11	32	100

* In 2010, these plots were placed on patches of disturbed ground from where hatchling turtles had successfully emerged that spring; these plots were tilled in 2012.

**In 2010, these plots were grassy controls; these plots were tilled in 2011.

Nesting habitat enhancement at EBLES site

In 2011, turtle nesting habitat was enhanced and surrounded by a fence within equestrian grounds maintained by EBLES (Ovaska and Engelstoft 2012). In 2013, time-lapse camera recorded images of two adult turtles in the area. One turtle spent almost an hour in the enhanced area in the evening of 13 July but did not excavate a nest. On 25 July, there was a nesting attempt on the path immediately adjacent to the enhanced area. The camera view covered only a portion of the enhanced area, and additional instances of nesting may have escaped detection.

Maintenance of the enhanced site consisted of weeding and removal of blackberry bushes from the surrounding area, carried out by CRD Parks volunteers in May and September 2013.

4.2.2. Swan Lake and Christmas Hill Nature Sanctuary and Capital City Allotment Gardens

In Swan Lake-Christmas Hill Nature Sanctuary, new nesting areas were created at two sites in May 2013, and a previous established nesting area was monitored throughout the spring and early summer (Figure 9). The nesting site creation consisted of clearing an area of grass and weeds to expose bare ground at sites that were deemed suitable for turtles. At one of the sites, the nesting site creation was conducted in conjunction of the removal of invasive Reed Canary Grass (*Phalaris arundinacea*), so providing turtles an easier access to the nesting area from the lake. There are old anecdotal observations of turtles nesting in this general area in the past.

The previously restored site, located below the trail by the nature house at Swan Lake, was monitored by the sanctuary staff during the nesting season. One emerged nest was found, on 25 April 2013. In addition, a visitor photographed a tagged turtle (L19R89) digging a nest on 17 June 2013 at the site (Figure 10).

One turtle marked and regularly located at Swan Lake nested at Capital City Allotment Gardens, across the Patricia Bay Highway from Swan Lake, in 2012. The following spring, on 8 May 2013, we inspected the site but found no signs of an emerged nest. The entire garden plot was covered with dense weeds. On 23 May 2013, the same turtle (L137R89) was seen wandering in the gardens again, and on 24 May 2013, a gardener observed a turtle, probably the same female, digging a nest in another garden plot. The site was enclosed with deer fencing to protect it from disturbance from gardening activities, and a poster (Appendix 1) was prepared and distributed to gardeners to solicit possible further observations.

Figure 9: Location of restored and enhanced Western Painted Turtle nesting sites at Swan Lake.

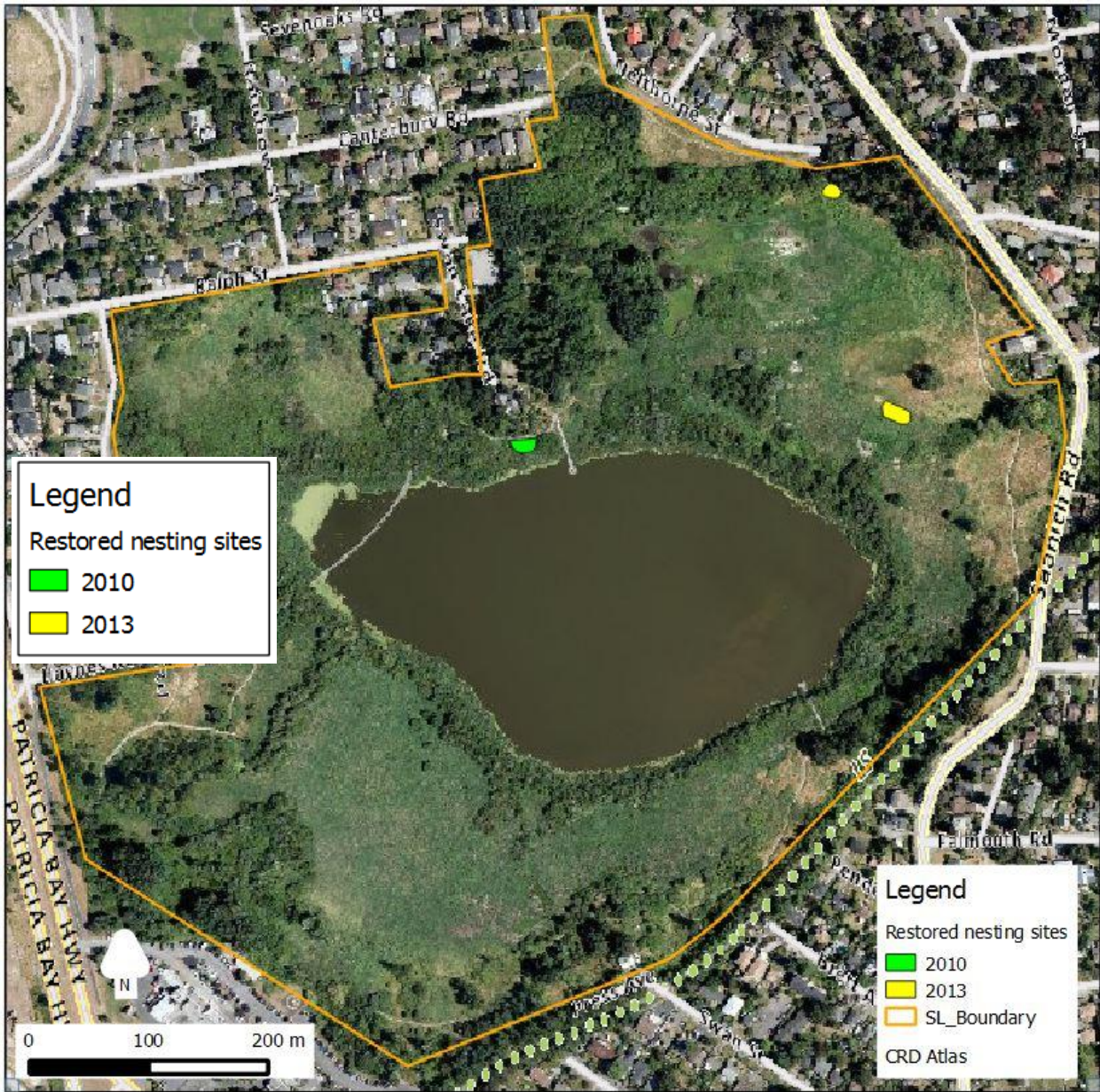


Figure 10: A Western Painted Turtle laying eggs at a restored nesting area at Swan Lake (photo by Burl Jantzen).



4.2.3. Alberni Valley

During a site visit to the Airport Wetlands on 31 May 2013, we examined the turtle nesting area enhanced in 2011 and other nearby areas for signs of emerged nests. The enhanced nesting area was located in an abandoned gravel pit, where habitat was deemed poor due to a very hard, rocky substrate (Ovaska and Engelstoff 2012). To enhance the area for turtles, two sand dunes (approximately 12 m long, 3.5 m wide) were created, each with a gentle slope facing south along the long axis.

On 31 May 2013, we found signs of turtle nesting activity on both dunes. One predated nest, with egg shells strewn around, was seen on Dune 1; four nests, similarly predated, were seen on Dune 2. Several emerged nest holes were found on a mound of hard soil and gravel behind the sand dunes. At another, previously identified nesting area along an old spur road, we found several emerged holes and predated nests. The emerged nest holes at both sites were also noted by Rick and Libby Avis during a previous inspection of the site earlier in May.

From 31 May – 6 July 2013, time-lapse camera images recorded adult turtles on seven occasions at the old spur road nesting area. Turtles completed nesting on four instances, on 12, 13 and 29 June. On three occasions, adult turtles were seen walking through the nesting area, but they disappeared from the camera view without digging a nest. The camera showed only a portion of the nesting area, and it is possible that these turtles also nested at this site. Turtles first appeared in the images from 17:00 – 20:24 h and remained from 20 min to 2:12 h.

Unfortunately the time-lapse camera at the enhanced site failed, and no images were obtained. Little vegetation was growing on the dunes, and no maintenance activities were deemed necessary. On 31 May 2013, Island Timberlands personnel worked on

the deactivated road leading to the enhancement site to make it impassable to all-terrain vehicles.

5.0 Enhancement of Aquatic Habitat

5.1 Elk-Beaver Lake Regional Park

Basking opportunities for turtles were previously enhanced in two ponds by the addition of three types basking structures: logs or log structures (installed in 2010; Ovaska and Engelstoft 2011), mill-end slabs placed perpendicular to the shoreline and anchored to the shoreline vegetation at one end (installed in 2011; Engelstoft and Ovaska 2012), and composite boards, consisting of a center board with a wooden platform at one end, suspended by styrofoam floats, designed by Camosun College students (installed in 2012; Engelstoft and Ovaska 2013; Umphrey et al. 2013).

On 23 April 2013, we inspected the basking structures in the two ponds for continued functionality. Exceptionally high water levels in both ponds in winter – spring 2013, caused by beaver activity, had compromised many of the boards. The one composite board in each pond had flipped over, probably due to an imbalance caused by water-logging of the center board. Several of the slabs had dislodged; a few could not be found and had most likely sunk. We were able to reposition both composite boards and most of the dislodged slabs. During the inspection, we observed three adult Western Painted Turtles basking on two of the log structures installed in 2010 in one of the ponds. Although still usable, the portion of the logs extending into the water was limited due to high water levels and vegetation in-growth. Installation of an actual large log in both ponds is desirable but should be conducted later in the season to avoid disturbance to shoreline vegetation and shallows used by native amphibians (Pacific Treefrog and Northwestern Salamander) for egg-laying in spring.

5.2 Swan Lake-Christmas Hill Nature Sanctuary

In Swan Lake, basking habitat enhancement for turtles began in 2010 with the installation of a large log to the lake by the sanctuary staff, followed by experimentation with various smaller structures, including mill end slabs and composite boards (Ovaska and Engelstoft 2011, Engelstoft and Ovaska 2013). These smaller structures are easy to handle and install and are readily used by turtles. However, over time, the mill end slabs became susceptible to water-logging and choking by mats of emergent vegetation (Ovaska and Engelstoft 2012). The constructed logs worked well during the first summer, but winter storms caused most of them to flip over exposing the Styrofoam used for buoyancy (Ovaska and Engelstoft 2012). A donation of a truck-load of logs allowed us to install more permanent basking sites for the turtles in spring 2014 (Figures 11 – 13). Seventy logs were transported to the lake by hand using a logging arch in January 2014. Most of the logs were pulled by a small boat along the edge of the lake and temporarily anchored. During spring 2014, the logs will be secured to place more permanently to prevent damage to infrastructure such as boardwalks.

Figure 11. Turtle basking logs waiting transportation to Swan Lake, January 2014.



Figure 12. Logging arch used to transport logs site to Swan Lake.



Figure 13. Logs awaiting installation in Swan Lake.



5.3 Other sites

Previously installed basking logs were inspected at sites in Metchosin and Saanich and restored where needed. In spring 2013, we received a report of 12 turtles were seen on an installed log structure in a private pond in Metchosin; on a subsequent visit to the site on 16 April 2013, we observed ten Western Painted Turtles on this log. We also inspected two sites in Saanich but did not see any turtles during the visits.

6.0 Discussion

6.1 *Distribution and threats*

In 2013, surveys of water bodies and reports from landowners and the public continued to increase our knowledge of the distribution of Western Painted Turtles on Vancouver Island. New sites were found both in the Alberni Valley and CRD. Soliciting landowners and the public to report turtle observations and following up with site visits was a successful approach. Surveys in the Cowichan area failed to locate the species, but the lateness of the season may have been a factor.

An interesting new finding was the confirmation of relatively large numbers of Western Painted Turtles from two ponds in Metchosin, where an aggregation of 25 and ten turtles, respectively, were seen. We have observed similarly large numbers of Western Painted Turtles (≥ 10 individuals) at any one time at only three other sites in CRD (at Elk-Beaver Lake, Langford Lake, and Swan Lake), and at two sites in the Alberni Valley (Airport Wetlands and Devil's Den Lake). Turtles of all sizes were found at one of the new sites in Metchosin, in a golf course pond, suggesting that the turtles were successfully breeding in the area. All ten turtles seen at the other Metchosin site in 2013 were adults, and no suitable nesting habitat was identified in the vicinity of the pond. The observation occurred in April, and it is possible that this site represents over-wintering habitat from where the turtles disperse across the landscape as the season progresses.

Turtles face numerous threats within the urbanized and fragmented landscapes in the CRD, and activities associated with forestry and logging roads are potential threats in the Alberni Valley. While some populations seem to be thriving, as indicated by relatively large numbers of turtles seen and the presence of turtles of different sizes including juveniles, only low numbers of Western Painted Turtles were found at most sites. Without more accurate information on the demography and population trends, it is impossible to assess the viability of any of these populations. A recent genetic study indicates that Western Painted Turtles are native to the Pacific coast (Jensen 2013). However, it is possible that the presence of the species at sites with observations of only 1 – 3 turtles is the result of recent introductions or translocations by the public, as suggested by Jensen (2013) for some Lower Mainland sites. The widespread presence of Sliders in water bodies on the island shows that human introductions of turtles have occurred throughout the range of the Western Painted Turtle on Vancouver Island, especially in the vicinity of population centres within CRD, where they were commonly encountered during this study.

CRD Regional Parks provide refuges for turtles and other wildlife within largely urbanized and modified landscapes. The challenge is to protect turtles and their habitat from disturbance without unduly impeding recreational and other activities that take place in the parks. A relatively large population of Western Painted Turtles is found in Elk-Beaver Lake Regional Park. Other regional parks with smaller numbers of turtle

observations are Matheson Lake and Thetis Lake parks. Despite numerous surveys, including those in 2013, we have detected only one to three Western Painted Turtles at any one time in Matheson Lake. There is an older anecdotal observation of an aggregation of eight Western Painted Turtles basking on a log in the lake. Clearly, Western Painted Turtles use the lake, and evidence of nesting has been detected on a small island in the lake (turtle species unknown); however, the seasonal importance of the lake to Western Painted Turtles remains unknown. At Thetis Lake Regional Park, the Western Painted Turtle has been confirmed from only McKenzie Lake, a portion of which is within the park and the remainder is within private residential lands. To date, this species has not been found in Thetis Lake itself, although many surveys have been conducted there. Numerous sliders have been observed regularly in Thetis Lake, as well as in other CRD Parks (Table 2).

6.2 Nesting Habitat Enhancement

Availability of suitable nesting habitat was identified as a limiting factor for turtle populations at most sites on Vancouver Island, where little habitat with suitable substrates and exposure seem to exist close to occupied water bodies. As a result, turtles tend to make extensive use of driveways and lawns in residential areas and sides of logging roads on forestry lands. Such nesting sites and travel to and from them across the landscape place turtles at risk from roadkill, predation, and other sources of mortality. To mitigate these threats, we have engaged in nesting habitat enhancement at several sites both in the CRD and Alberni Valley. Because relatively little is known of natural nesting habitats of coastal populations of the Western Painted Turtle, it is important to monitor the use of the enhanced habitats by turtles and apply adaptive management, as needed.

At Elk-Beaver Lake Regional Park, nesting habitat enhancement and nest site monitoring have taken place annually since 2008. At a site in old-field habitat, tilling small plots to remove grass and weeds to expose bare soil preferred by turtles for nest excavation has proven to be a successful approach to enhance nesting habitat, as indicated by the preferential use of the tilled plots by nesting turtles. The relatively high success of these nests, as indicated by the number of emerged nest holes found in spring the year following egg-laying, shows that the tilled plots do not represent sink habitat but contribute hatchlings to the population. The advantage of tilling small plots rather than the entire area gives turtles a choice of a variety of substrates, and turtles continue to use areas outside the tilled plots as well. Therefore, despite of the success of tilling, we recommend that this “light touch” approach be continued at this site. The disadvantage of tilling is that it needs to be repeated each year, as the cleared plots are quickly invaded by weeds. Studies on the use of previously tilled plots by turtles and the amount of maintenance required are in progress.

The discovery of 12 Western Painted Turtle hatchlings in Bullfrog (*Lithobates catesbeianus*) stomachs (Jancowski and Orchard 2013) suggests that they are a threat to turtles. Bullfrogs are abundant in the ponds close to the nesting ground in Elk-Beaver

Lake Regional Park. To mitigate this threat, we suggest that Bullfrog populations in the ponds be controlled.

Overall, nesting success at the East Pond site was relatively low in 2013 when compared to previous years. This was largely due to flooding of the lower third of the nesting area by beaver activity in winter 2012 – 2013. It is unknown whether hatchlings in the inundated nests were killed or forced to emerge early and overwinter in the pond. Beaver activity creates ponds and shallow areas preferred by turtles, and hence it is expected to have an overall positive effect on turtles over the long term. However, as in this case, inundation of nests close to the shoreline can occur when new dams are constructed. CRD parks staff removed the dam and slowly let out the water over the course of the spring and summer 2013, mainly because the flooding made several high-use trails impassable.

At Swan Lake, an enhanced nesting area has received consistent but light use by turtles since its construction in 2010. Two additional nesting areas were created in 2013 in other areas around the lake by sanctuary staff and volunteers, following a restoration plan created for the turtle population as part of this project. Surveys and telemetry studies have confirmed that Western Painted Turtles use much of the lake in summer, and it is hoped that the increased availability of nesting habitat will provide opportunities for them to nest over a wider area of the sanctuary.

In Alberni Valley, we collaborated with Island Timberlands to enhance nesting habitat for turtles within forestry lands. Since the enhancement took place in summer 2011, the site has been monitored only infrequently due to its remoteness. During a visit in 2012, turtle tracks were noted crisscrossing across the dunes, but no nests were found. In 2013, while inspecting the dunes for emerged nests in spring, we found several nests (egg laid in 2012) in the dunes, but unfortunately all had been predated. However, the presence of nests indicates that turtles are using the enhanced areas. In 2012, we suspected that the sand used as the substrate was too soft for the excavation of nesting chambers and would benefit from the addition of firmer materials. However, in light of the presence of nests and observations that the substrate appeared to be compacting, we decided to let the dunes continue to settle naturally without further modifications. Turtles continued to nest at a nearby site on an old spur road across a main logging road from the wetland and are potentially exposed to roadkill during this migration. Monitoring the road crossing with remote cameras would be desirable to assess the threat from roadkill.

In 2012, we successfully monitored nesting activity by turtles at one of the nesting habitat enhancement sites in Elk-Beaver Lake Regional Park using a time-lapse camera (Engelstoft and Ovaska 2013). Encouraged by this success, we installed cameras at both nesting habitat enhancement sites in the park and at two sites in the Alberni Valley, including the nesting habitat enhancement site and a nearby previously identified nesting area. Unfortunately, two of the cameras, both at habitat enhancement sites, failed. One failure was due to human error, while the other was mechanical. Other problems we encountered was in the placement of the cameras, which had to be

sufficiently high to prevent casual vandalism but still accessible for maintenance and removal; they also had to be at a correct angle pointing downwards to show much of the area of interest. Despite these failures, we recommend continued use of remote cameras but with frequent downloading of images during the peak nesting period for early detection of any problems that may arise. Time-lapse cameras potentially provide a cost-effective and accurate way to monitor nesting activities by females and are especially valuable in remote areas, such as the habitat enhancement site in the Alberni Valley. In contrast, hatchling turtles are too small to monitor adequately with remote cameras, but emerged nest holes can be found with relative ease during site visits in spring.

6.3 Aquatic Habitat Enhancement

Turtles derive their body heat from the environment and actively need to seek warm microhabitats and bask in the sun to elevate their body temperature, activities that are particularly important in spring and fall when ambient temperatures are low (COSEWIC 2006). Basking helps turtles digest their food and provides an essential source of Vitamin D; it also helps reduce parasite loads on the turtles' body. Since 2010, we have added basking structures to water bodies, where basking opportunities were deemed to be limited. In general, turtles began using the structures almost immediately, suggesting that the enhancement was indeed beneficial. In addition to helping turtles, basking structures facilitate turtle viewing by visitors and increase their awareness of turtles as part of our native wildlife. However, care must be taken to install basking structures in places where the turtles are not exposed to disturbance from the shore. Turtles can often be seen basking on the installed structures in Swan Lake and in the ponds in Elk-Beaver Lake Regional Park. The addition of basking structures also facilitates surveys. In 2013, an aggregation of ten turtles was observed on a composite board that was installed in a pond in Metchosin in spring 2013. Although the Western Painted Turtle had been previously reported from this site, it was a surprise to find this number of them in the small pond.

To enhance basking habitat, we have used several different kinds of structures, including mill-end slabs, logs or modified logs, and composite boards. The use of all these different kinds of structures by turtles has now been well established. However, problems have been encountered with the longevity of the structures over more than one year. Mill-end slabs may be acquired free of cost and are easy to install. However, they can suffer from water-logging, especially if slabs with thin ends are used. The composite boards, which were designed by Camosun College students especially to avoid water logging (Umphrey et al. 2012), turned out to be too unstable in their present form, and most had flipped over in winter. Actual logs provide the most durable basking structures but may be difficult to acquire and transport, if not found immediately adjacent to the water body. A large log with a root-mass that was installed in Swan Lake by the sanctuary staff in June 2010 continued to be functional in 2013. Seventy large logs were installed in spring 2014 to Swan Lake as part of this project and will be monitored for use by turtles. Where possible, we recommend that actual logs, the larger the better, be used as basking structures, because of their durability and minimal required

maintenance. Smaller structures, such as slabs and composite boards, can be useful and cost-effective in small ponds because of the ease by which they can be acquired and installed, but their condition should be monitored, and replacement may be needed every few years.

7.0 Recommendations

The following priorities were identified for 2014:

- Within the CRD, Alberni Valley, and Cowichan Valley continue to fill in data gaps in survey coverage and follow up leads from anecdotal observations reported to HAT and Cowichan Land Trust by the public.
- Explore options to increase survey efforts to areas on the east coast of Vancouver Island north of Cowichan Valley.
- Control bullfrog populations in ponds located close to Western Painted Turtle nesting sites.
- At Elk-Beaver Lake Regional Park, continue monitoring and maintaining enhanced nesting habitat at the East Pond and equestrian grounds sites, including:
 - experimental tilling at East Pond
 - control weeds and vegetation growth in restored nesting areas
 - use time-lapse cameras to monitor nesting activity by females
- At Swan Lake and Christmas Hill Nature Sanctuary:
 - mitigate threats (including road mortality)
 - monitor use of enhanced nesting areas and basking logs
 - continue nesting habitat enhancement at selected sites
- At Airport Wetlands in Alberni Valley:
 - continue monitoring the condition of the enhanced turtle nesting site
 - use time-lapse cameras to monitor the use of identified nesting areas and migration route across a main logging road at this relatively remote site.
- At Elk-Beaver Lake Regional Park, Swan Lake, and Christmas Hill Nature Sanctuary, and other sites within CRD, continue monitoring the condition of previously installed basking structures.
- Explore opportunities to install basking structures to additional sites where turtles are deemed to benefit from this action and where educational opportunities are enhanced by increased visibility of turtles to site visitors.
- Continue HAT's landowner and outreach campaigns to solicit for anecdotal turtle observations, raise awareness of turtles, and involve residents in habitat stewardship.
- Continue working with existing habitat stewards, including large landowners and managers who have collaborated in habitat enhancement and threat mitigation projects as part of this study.

8.0 Literature Cited

- COSEWIC. 2006. COSEWIC assessment and status report on the Western Painted Turtle *Chrysemys picta bellii* (Pacific Coast population, Intermountain-Rocky Mountain population and Prairie/Western Boreal - Canadian Shield population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 40 pp. Available at: www.sararegistry.gc.ca/status/status_e.cfm (accessed Dec 2013).
- Engelstoft, C. and K. Ovaska. 2008. Western Painted Turtle surveys on Galiano, Pender, and Vancouver Island, 2008, including Surveys in selected CRD Regional Parks. Report prepared for CRD Parks and Habitat Acquisition Trust, Victoria BC. Available at: <http://www.hat.bc.ca> (accessed Dec 2013). 34 pp.
- Engelstoft, C. and K. Ovaska. 2011. Western Painted Turtle surveys and stewardship Activities on Vancouver Island in 2010. Report prepared for Habitat Acquisition Trust, Victoria, B.C. 68 pp.
- Engelstoft, C. and K. Ovaska. 2013. Western Painted Turtle habitat restoration and management guidelines: Swan Lake and Christmas Hill Nature Sanctuary. Report prepared on behalf of Habitat Acquisition Trust for Swan Lake and Christmas Hill Nature Sanctuary, Victoria, B.C. 25 pp.
- Jancowski, K. and S. A. Orchard. 2013. Stomach contents from invasive American bullfrogs *Rana catesbeiana* (= *Lithobates catesbeianus*) on southern Vancouver Island, British Columbia, Canada. *NeoBiota* 16: 17–37.
- Jensen, E. L. 2013. Genetic assessment of taxonomic uncertainty and conservation units in painted turtles, with focus on the at-risk *Chrysemys picta bellii* in British Columbia. M.Sc. thesis, Department of Biology, University of British Columbia, Vancouver, BC. 121 pp.
- Ovaska, K. and C. Engelstoft. 2009. Surveys for the endangered Western Painted Turtle within CRD Regional Parks in 2009. Report prepared for CRD Regional Parks (contact Marilyn Fuchs), Victoria, B.C. 33 pp.
- Ovaska, K. and C. Engelstoft. 2010. Western Painted Turtle surveys and stewardship activities on Vancouver Island and the Gulf Islands in 2009. Report prepared for Habitat Acquisition Trust (contact Adam Taylor), Victoria BC. 60 pp.
- Ovaska, K. and C. Engelstoft. 2012. Western Painted Turtle surveys and stewardship Activities on Vancouver Island in 2011. Report prepared for Habitat Acquisition Trust, Victoria, B.C. 69 pp.
- Umphrey, A., A. Kletchko, D. Desrosiers, and M. Burgess. 2012. Basking preferences and interspecies interactions of the Western Painted Turtle (*Chrysemys picta bellii*) at Swan Lake, Victoria, BC. Report prepared for Camosun College Environmental Technology Department, Swan Lake/Christmas Hill Nature Sanctuary, and Habitat Acquisition Trust, Victoria, BC. June 20, 2012. 64 pp.



Western Painted Turtle



The endangered Western Painted Turtle is the only remaining native turtle on Vancouver Island. Since 2008, Habitat Acquisition Trust (HAT) has undertaken habitat restoration and monitoring activities to help conserve turtles and their habitats.

Nesting season is approaching! Females come on land to lay their eggs. You may see them wandering on lawns or in gardens in June – early July. They are looking for a warm, bare patch of ground in which to dig a nest. The clutch of 8 – 12 eggs will hatch in the fall, but the young will dig themselves out of the nest the following spring.



HAT biologists are studying movements and nesting success of turtles to help with conservation efforts. In 2012, a female turtle, tagged at Swan Lake, migrated to the community gardens and nested there. **We are interested in hearing your turtle observations, especially if you see a turtle digging a nest.**



To report observations, please contact us:
christian@hat.bc.ca or 250- 652-9770 (Christian)
kristiina@hat.bc.ca or 250-727-9708 (Kristiina)
For more information, visit HAT's website: <http://www.hat.bc.ca>

Project Sponsors & Partners:

