

Western Painted Turtle Surveys on Galiano, Pender, and
Vancouver Island, 2008,
Including Surveys in Selected CRD Regional Parks



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Executive Summary

The Western Painted Turtle, *Chrysemys picta bellii* (Pacific Coast Population) was designated as endangered in Canada in 2006. The distribution and ecology of the species west of the Coastal Mountains are poorly known, hindering conservation efforts. The objectives of this study were to carry out surveys in selected areas on Vancouver Island and southern Gulf Islands to fill in data gaps in distribution and habitat use and to identify threats. A further objective was to solicit information on turtle sightings through public outreach and to involve private landowners and land managers in stewardship activities.

From June to September 2008, we surveyed a total of 76 water bodies for turtles. On Vancouver Island, the sites were within the Capital Regional District (CRD; n=37), Cowichan Valley (n=1), Nanaimo area (n=3), Port Renfrew area (n=2), and Alberni Valley (n=14). On the Gulf Islands, we surveyed 7 sites on Galiano and 12 sites on North Pender. On Vancouver Island, 14 sites were within the following CRD Regional Parks: Elk/Beaver Lake, Matheson Lake, Mount Work, Thetis Lake Regional Parks, and Sea to Sea Green Blue Belt Regional Park Reserve. Most sites were visited only once, but 30% were visited at least twice. We attempted to conduct surveys during optimal conditions (warm and sunny) for detecting basking turtles. Nesting activity was monitored at one site with frequent visits.

We encountered the Western Painted Turtle at ten of the water bodies surveyed, all on Vancouver Island. Six sites were within the CRD area (Langford Lake, Matheson Lake, Elk Lake, Beaver Lake and associated Beaver Ponds); one was in the Nanaimo area (Buttertubs Marsh); and three were in the Alberni Valley (Patterson Lake, Little Turtle Lake, “Airport Wetlands”). Within CRD Regional Parks, the Western Painted Turtle was found in Elk/Beaver Lake and Matheson Lake Regional Parks. We have a previous record of the species from 2005 in Durrance Lake, Mount Work Regional Park, but were unable to find it there in 2008, despite repeated surveys. CRD Regional Parks provide important refugia for turtles and other wetland species within developed and modified landscapes of southern Vancouver Island.

We encountered the non-native Red-eared Slider at 19 sites: one on Galiano, 12 within the CRD area on Vancouver Island, two in the Nanaimo area, and one in the Port Alberni area. The Red-eared Slider co-occurred with the Western Painted Turtle in four water bodies: Matheson Lake, Beaver and Elk Lakes and the adjacent Beaver Ponds in the CRD, and Buttertubs Marsh in Nanaimo.

Outreach activities included newspaper articles and radio and TV interviews. When possible, we followed up reports of turtles with site visits to determine the species of turtle and to discuss stewardship options with landowners. These reports revealed the presence of the Western Painted Turtle at three additional sites in CRD on Vancouver Island (Maltby Lake, McKenzie Lake, and Eagles Lake) and Devil’s Den Lake in the Alberni Valley, and the Red-eared Slider at three sites.

We located turtle nesting sites at four localities: in Elk/Beaver Lake and Matheson Lake Regional Parks in the CRD and in “Airport Wetlands” and Devil’s Den Lake in the Alberni Valley. We observed five nesting females of the Western Painted Turtle from 20 June to 1 July 2008 and numerous other new and old nests within a small area at one site (Elk/Beaver Lake Regional Park); the nesting areas at the other sites were also used communally. The sites in regional parks were close to water’s edge and turtles did not need to move across busy roads to access them. However, they were within heavily used recreational areas, and we observed disturbance to nests at both sites. In the Alberni Valley, we found nesting areas across a main

logging road from a water body occupied by the Western Painted Turtle at Airport Wetlands. At the Devil's Den Lake site, the nest sites were at the base and lower slopes of a bluff in natural forest openings.

Within CRD Regional Parks, main threats to the Western Painted Turtle include disturbance from recreational activities and pets, exotic species, and possibly road mortality, especially during the nesting season and when the hatchlings emerge, and illegal collection for pets or other purposes. Periodic removal of aquatic weeds at larger lakes may also harm turtles caught in the machinery. Recommended management actions include measures to reduce disturbance to nesting turtles, possibly through signage, fencing, or otherwise restricting human access to identified communal turtle nesting grounds during the nesting period from mid-May to early July.

Outside parks within the CRD, expanding urban development threatens turtle populations through loss and degradation of aquatic habitats and terrestrial nesting areas. Residents living near water bodies with turtles can help by preventing pollutants from entering water, ensuring that people and pets do not harass turtles while on land during the nesting season, and by reporting their observations of turtles, nesting attempts, and road kills.

In the Alberni Valley, forestry activities and trapping of beavers are probably the most important anthropogenic factors affecting turtles. Management recommendations include protecting identified nesting grounds from disturbance by restricting human access. Other recommendations include monitoring road kill during the nesting period and preventing in-growth of wetlands with vegetation by leaving forested buffers around all wetlands and allowing beavers to alter water levels.

Recommendations for further studies in 2009 include expanding survey effort to additional areas on Vancouver Island and the Gulf Islands and revisiting water bodies that contain potential habitat but were surveyed only once in 2008. Systematic monitoring of communal nesting grounds in CRD Regional Parks, Alberni Valley wetlands and other selected sites, and clarification of threats from road mortality and aquatic weed removal are also required. We also suggest studies of visitor-turtle interactions within CRD Regional Parks.

Plates



Plate 1. Numerous nests of the Western Painted Turtle were found within a 12 x 10 m area at the Beaver Ponds in Elk/Beaver Lake Regional Park.



Plate 2. Western Painted Turtle in the process of excavating a nest at the above nesting area on 29 June 2008.

A. Undisturbed, new nest



B. Uncovered new nest; nesting turtle probably disturbed



C. Emerged nest from the previous season, characterized by a square hole; two emerged nests were excavated and contained remains of egg-shells.



Plate 3. Sample of turtle nests found at the Beaver Ponds nesting grounds in Elk/Beaver Lake Regional Park in June 2008.



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*Cover photo: Western Painted Turtle Hatchling at Elk/Beaver Lake Regional Park, June 2008.
Photo by Christian Engelstoft.*

1.0 Introduction

The Pacific Coast Population of the Western Painted Turtle (*Chrysemys picta bellii*) occupies the lower Fraser River valley, Sunshine Coast, parts of Vancouver Island, and some of the Gulf Islands, within a densely populated part of British Columbia. The Pacific Coast Population was designated as endangered in Canada in 2006 due to habitat loss, degradation, and fragmentation throughout much of its range and apparent declines in numbers of occupied sites (COSEWIC 2006). Wetlands and associated terrestrial habitats required by the species continue to diminish and degrade as the human population expands. Even parks and other protected areas are not necessarily secure for turtles, as introduced species, road mortality, and recreational activities can pose serious threats (COSEWIC 2006).

Information is needed on the distribution of the species, availability and quality of wetland and nesting habitats, mortality factors such as road kill, and presence and effects of introduced Red-eared Sliders (*Trachemys scripta*) and American Bullfrogs (*Rana catesbeiana*) at occupied sites. Bullfrogs are widespread within turtle habitats and at least occasionally prey on hatchling turtles, thus possibly limiting recruitment, as suspected for the Western Pond Turtle in the Pacific Northwest of the United States (Hays et al. 1999, Corn and Heinrich 1998). Red-eared Sliders co-occur with Painted Turtles in several water bodies and may be a threat to the Painted Turtle by competing for food, nesting, or basking sites (COSEWIC 2006). It is unclear whether Red-eared Sliders are able to reproduce successfully in this region (Matsuda et al. 2006), but nesting attempts have been observed (CE, KO, pers. obs; M. Evelyn, pers. comm.).

Surprisingly little is known of the distribution and patterns of abundance of turtles in coastal British Columbia, and most areas have not been surveyed. Recent survey effort has focused on the Lower Mainland (Bunnell 1995) and the Sunshine Coast (MOE 2007, 2008; K. Paige and M. Evelyn pers. comm.), but Vancouver Island and the Gulf Islands have received little attention. Increasing knowledge of the distribution of the turtles is the first step towards conservation and recovery of populations. Here we present results of surveys carried out from June to September 2008 on southern Vancouver Island and the Gulf Islands and an assessment of habitat quality and threats at occupied sites. On private lands, our efforts also focused on landowner contacts and outreach to encourage stewardship of habitats suitable for turtles.

2.0 Objectives

The overall goal of the project is to contribute information on the distribution, aquatic and terrestrial habitats, and threats facing the Western Painted Turtle (Pacific Coast Population), so that populations and habitats can be protected through stewardship and other recovery activities. The specific objectives of the first year of this project in 2008 were to:

- Survey lakes, ponds and wetlands within the Capital Regional District (CRD) on southern Vancouver Island and the Gulf Islands, and in the Alberni Valley for the Western Painted Turtle
- Collect preliminary information on habitats and assess threats at sites where the species is found
- Conduct outreach activities and solicit information about Western Painted Turtles from the public and residents in selected neighbourhoods
- Involve private landowners and land managers in monitoring and stewardship activities

3.0 Methods

3.1 Study Area and Sites

The study was located on southern Vancouver Island and southern Gulf Islands. On Vancouver Island, we surveyed lakes, ponds, and marshes located within the Capital Regional District, in the Nanaimo area, and in the Alberni Valley. In the Gulf Islands, we surveyed water bodies on Galiano and North Pender Islands (see Appendix 1 for details of locations). The sites in the Alberni Valley and westernmost sites within the CRD are within the Coastal Western Hemlock Biogeoclimatic Zone; the remaining sites are within the Coastal Douglas-fir Biogeoclimatic Zone. In all areas, the upland habitat consisted of mostly coniferous forest or mixed-wood forest, but some were in agricultural and old-field settings.

Within CRD Regional Parks on Vancouver Island, we surveyed most of the larger water bodies and associated wetlands. The following 14 sites were surveyed: Elk, Beaver, Durrance, Thetis, Matheson, Pease, Fork, Killarney, Prior, MacKenzie, Shields, Grass, and Peden Lakes and Beaver Ponds adjacent to Beaver Lake.

Outside regional parks within the CRD area, we selected sites from the Natural Areas Atlas (www.crd.bc.ca), focusing on larger water bodies. We also followed up on reports of turtles from the public and landowners, and surveyed sites on private lands when access was granted.

The Alberni Valley was selected because it contains wetlands with historical records. In this area, we focused on warmer, lower elevation lakes, as they are most likely to provide habitat for turtles. Our surveys were directed to suitable lakes by local naturalists, Rick and Abby Avis, who have previously found the Western Painted Turtle at some of these sites.

On Galiano and North Pender Islands, we focused on larger water bodies, but also surveyed some small ponds and dug-outs. On Galiano, we worked closely with the Galiano Conservancy Association staff, who directed us to wetlands with sightings of turtles by residents.

3.2 Survey Protocol

Survey methods consisted of visual searches of water bodies for turtles either from vantage points on the shore or through circumnavigation by boat. We attempted to view the entire shoreline, but in some cases surveyed only a portion of a water body due to access or other logistic constraints. Usually two observers conducted the surveys, sometimes one, and rarely more than two. When multiple observers were present, they usually scanned the same general area to increase chances of detecting turtles among often dense emergent and floating vegetation. To obtain information on survey effort, we timed each survey. Weather information collected at survey sites included air and water temperature, percentage cloud cover, and precipitation. Road kills were located opportunistically from vehicles.

3.3 Habitat and Threat Assessment

At each site, we conducted a preliminary habitat and threat assessment, adapted from protocols developed by the Ministry of Environment. Habitat variables recorded included the following:

- landscape context (backcountry, rural, urban)
- predominant upland habitat (coniferous, deciduous, mix-forest, other)
- wetland type (lake, pond, marsh, other) with modifications noted (dug-out, dams, beaver maintained)

- percentage cover of littoral zone with emergent and when possible submerged vegetation
- percentage cover of riparian zone along the perimeter of the water body (forest, shrubs, grass-herbs, development, or other)
- Availability of basking logs (none, low, moderate, high)
- Availability of nesting sites (confirmed, potential, not identified), including a description of identified sites

At each site where the Western Painted Turtle was found, we rated the potential threats from roads (paved or unpaved), recreation (motorized or non-motorized), pets, exotic species (bullfrogs and introduced turtles), residential development, other urban development, agriculture, forestry, grazing, water withdrawal, or other sources as “non-existent”, “low”, “moderate”, or “high”.

3.4 Stewardship and Outreach

Outreach activities included newspaper articles and radio and TV interviews. We solicited information about turtle sightings from the public through these sources and through posters placed at bulletin boards and other strategic locations within target neighbourhoods. When possible, we followed up reports of turtles with site visits to determine the species of turtle and to discuss stewardship options with landowners. We worked with local naturalists on Saturna, Mayne, and Pender Islands and in the Alberni Valley, and with the Galiano Conservation Association in outreach and contacting landowners.

3.5 Data Handling and Mapping

All data were entered into MS Excel spreadsheets. For survey sites within the CRD, maps were generated using the Natural Areas Atlas. All maps in figures used the UTM projection (UTM Zone 10U North, NAD 83). For unnamed wetlands, we used colloquial names used by local residents (see Appendix 1 for coordinates of sites).

UTM coordinates for each site were determined either by a handheld Garmin Map76 in the field or from the Natural Areas Atlas (www.crd.bc.ca).

The following disclaimer regarding the maps was provided by the CRD GIS department to negate any legal liability:

"The data represented on maps have been provided to the Capital Regional District (CRD) under mutual agreement with several agencies and contractors. The CRD cannot be held responsible for inaccuracies or errors. Any users of this map series accept full liability for loss or damage."

4.0 Results and Discussion

4.1 Survey Effort

We surveyed 76 sites on Vancouver, Galiano and North Pender islands for a total of 89 h of survey time (not person-hours). Figure 1 shows the areas where most of the surveys took place; the geoposition of these and additional sites in other areas surveyed can be found in Appendix 1. Most surveys (n = 101) were on foot; 37 were from boat or by a combination of walking and boat. We visited most sites only once, but conducted repeated surveys at 23 sites (50 sites were visited once, 16 sites twice, two 3 times, two 5 times, one 5 times, one 9 times, and one 22 times). The highest number of surveys was at a site within Elk/Beaver Lake Regional Park, which was inspected for nesting turtles almost daily during the peak nesting period. The duration of the surveys varied depending on the size of the water body, whether it contained suitable habitat for turtles, and access and visibility. Survey duration per site ranged from 10 to 264 minutes (mean = 44 min; median = 30 min).

Vancouver Island:

- Alberni Valley: 14 sites
- Nanaimo area: 3 sites
- Cowichan Valley: 1 site
- Port Renfrew area: 2 sites
- CRD Regional Parks: 14 sites
- Other areas within CRD: 23 sites

Galiano Island: 7 sites

North Pender Island: 12 sites

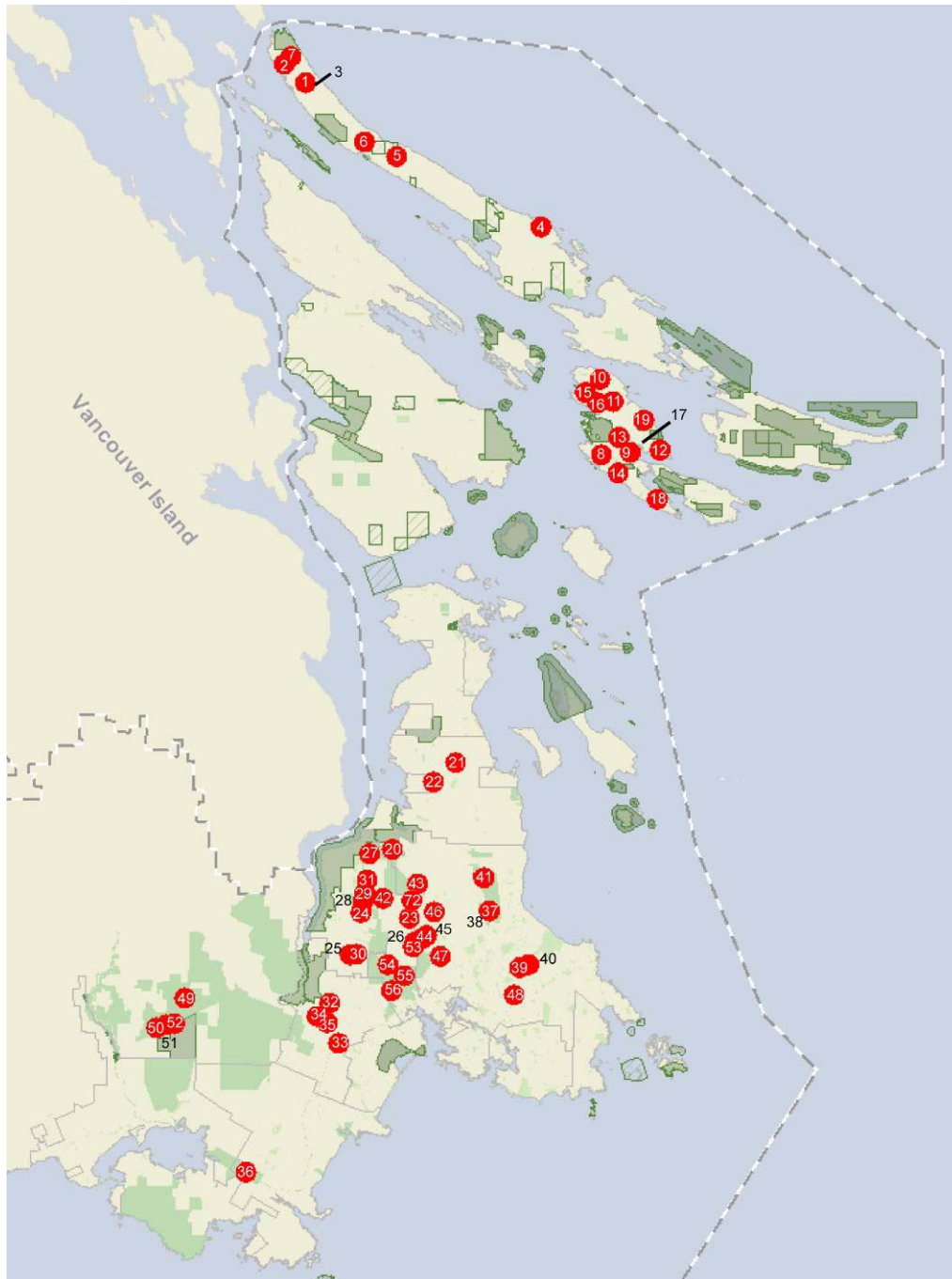
The surveys took place from 27 June to 12 September, with the exception of two surveys in May 2008. We attempted to survey during warm, sunny days, when turtles are most easily seen while basking on logs. Ambient temperature ranged from 9°C to 32°C (mean and median = 21°C), and the sky was most often clear or partially clear during the surveys (Appendix 2). Time of day was variable, often depending on logistics. Kathy Paige (BC Ministry of Environment) contributed survey data for 10 sites (Appendix 2).

4.2 Overview of Survey Results

4.2.1 Western Painted Turtle

We found the Western Painted Turtle at ten of the 76 water bodies surveyed in the summer of 2008, all on Vancouver Island. Six of the sites were within the CRD area; one was in Nanaimo; and three were in the Alberni Valley (Table 1). An additional observation in CRD was made by one of us (CE), who encountered an adult dead on Oldfield Road in Saanich near a small pond. The landscape setting ranged from backcountry for the Port Alberni sites to urban and rural for the Nanaimo and CRD sites occupied by the turtles. Most observations of the Western Painted Turtle were from shallow bays of larger lakes or from ponds and marshes with open water and abundant emergent vegetation, such as yellow pond lilies (*Nuphar polysepalum*) or pondweeds (*Potamogeton* species). In the Alberni Valley, a dominant species is Watershield (*Brasenia schreberi*). Lack of observations from the remaining water bodies does not necessarily indicate absence. Many sites were surveyed only once, and repeated visits under optimal conditions for detection are required to infer absence with reasonably certainty.

Figure 1: Sites surveyed for turtles within the Greater Victoria area and the southern Gulf Islands in 2008 (sites numbers correspond to those in Appendix 1)



The water bodies surveyed included 44 lakes, 25 ponds, and 7 marshes. There were 8 sites in urban, 46 in rural, and 22 in backcountry areas. The upland habitat was mostly coniferous forest or mixed-wood forest but some were in agricultural and old-field settings or adjacent to a golf course.

The sites were distributed as follows among the islands and regions (see Appendix 1 for details of locations and Appendix 2 for survey dates and times for each site):

Table 1: Observations of the Western Painted Turtle during surveys on Vancouver Island in 2008

Location	Date	# of turtles seen	Activity	Size-class	Notes on observations
<u>Capital Regional District:</u>					
Beaver Lake	06-Jun-08	1	Walking on land	Small	Hatchling by north beach near playground on west side of the lake; moving towards lake
	07-Jun-08	3	Basking	Large, small	
	7-Jul-08	1	Walking on land	Large	Entering land from dog swimming site near west end of lake; shell damaged at edges
Beaver Ponds	16-Jun-08	2	Basking	Large	Digging at nesting grounds; carapace 23 cm, plastron 20 cm Was seen digging nest about 10 m from house sign 778 towards house Digging at nesting grounds at 8 pm; piece of shell missing by right hind leg; crack on shell along mid-dorsal line by tail Digging at nesting grounds at 8:15 pm; second turtle coming to land at 9:10 pm Turtle seen scurrying to pond; fresh nest found at site where the turtle was seen Turtle on bank of west pond
	16-Jun-08	1	Basking	Large	
	20-Jun-08	1	Nesting	Large	
	20-Jun-08	1	Nesting	Large	
	27-Jun-08	1	Nesting	Large	
	29-Jun-08	2	Nesting	Large	
	1-Jul-08	1	Nesting	Large	
23-Aug-08	1	Basking	Large		
Elk Lake	22-Jul-08	1	Basking		
Langford Lake	27-Jun-08	6	Basking	Large, medium	Three turtles together on mud bank; two on shoreline by cat-tails Adult on log On separate logs
	30-Jun-08	5	Basking	Large	
	30-Jun-08	1	Basking	Large	
	30-Jun-08	2	Basking	Medium	
Matheson Lake	23-Jul-08	1	Basking	Large	On log at west end of lake
Oldfield Road	16-Aug-08	1	Dead on road	Large	Roadkill next on Oldfield Rd about 18:00; UTM: 469196E 5375666N; pond by road
Swan Lake	09-Sep-08	2	Basking		
<u>Nanaimo:</u>					
Buttertubs Marsh	28-Jul-08	2	Basking	Large, medium	Along vegetated shoreline
	28-Jul-08	1	Swimming		
<u>Alberni Valley:</u>					
"Airport wetlands"	12-Aug-08	1	Basking	Large	Rick Avis has seen & photographed CHPI on several previous occasions
	13-Aug-08	3	Basking	Large	
Little Turtle Lake	13-Aug-08	1	Basking	Large	On log

Location	Date	# of turtles seen	Activity	Size-class	Notes on observations
	13-Aug-08	1	Swimming	Large	Caught by hand; carapace: 14.1x13 cm (curved); plastron: 12.7 cm long (straight); 6.8 cm wide (from pinched center)
Patterson Lake	12-Aug-08	1	Basking	Large	

4.2.2 Red-eared Slider

We found the non-native Red-eared Slider at 19 of the 71 water bodies surveyed (Table 2). Twelve of the sites were within the CRD area on Vancouver, North Pender, and Galiano Islands; two were in Nanaimo; and one was in the Alberni Valley (Table 2). On Galiano, we saw from a distance a basking turtle that might have been a Western Painted Turtle, based on its red underside and low carapace profile. However, several Red-eared Sliders were found in the lake on a subsequent survey, and the earlier observation remains enigmatic. At Durrance Lake, Vancouver Island, a large Red-eared Slider was interrupted on its way up the bank in the evening of 28 June 2008 possibly for nesting. We saw a Red-eared Slider digging at approximately the same location the previous year.

The Red-eared Slider co-occurred with the Western Painted Turtle in four water bodies: Matheson Lake, Beaver Lake, and Beaver Ponds in CRD, and Buttertubs Marsh in Nanaimo. An earlier observation in 2005 indicated that the two species also co-occurred at Durrance Lake at that time. The Red-eared Slider was found alone in nine lakes and five ponds, while the Western Painted Turtle was found alone in three lakes, all in the Alberni Valley.

Table 2: Observations of the Red-eared Slider during surveys on Vancouver Island and the Gulf Islands in 2008.

Location	Date	# of turtles seen	Activity	Size-class	Notes on observations
<u>Galiano Island:</u>					
Laughlin Lake	05-Sep-08	5	Basking	Large (4), Medium (1)	
<u>North Pender Island:</u>					
Corbett Rd	24-Jun-08	1	Basking	Large	
Liberto Rd	24-Jun-08	1	Basking	Large	
Tindle Wood	24-Jun-08	1	Basking	Large	
<u>Vancouver Island, CRD:</u>					
Beckwith Park	06-Aug-08	2	Basking	Large	Covered with duckweed but ID from red-ear & domed carapace Also dead turtle in water by abandoned turtle basking trap
	06-Aug-08	4	Swimming	Large	
Beaver Lake	07-Jun-08	2	Basking	Large	In bay on west side of lake on a small island
	22-Jun-08	1	Basking		
Beaver Ponds	12-Sep-08	1	Basking	Large	West Pond: Turtle on bank next to installed turtle basking board; 4 wood ducks on the board
Durrance Lake	07-Jun-08	3	Basking	Large	Marsh 2, lake 1
	16-Jun-08	6			
	28-Jun-08	1			

Location	Date	# of turtles seen	Activity	Size-class	Notes on observations
Elk Lake	22-Jul-08	1	Basking		
	22-Jul-08	2	Basking		
	22-Jul-08	1	Basking		
Florence Lake	11-Sep-08	1	Basking	Large	Survey from bridge; turtle on mudflats
Hovey Rd Pond	07-Aug-08	1	Swimming	Medium	Attempted nesting 26 Jul-08, reported by landowner
Matson Lake	24-Jul-08	1	Basking	Large	
Matheson Lake	27-Jun-08	1	Basking	Large	
	23-Jul-08	1	Basking	Large	West end of lake; on same log as seen previously
Prospect Lake	18-Jul-08	1	Basking	Large	Turtle on log at 10U-467075E, 5372989N
	06-Aug-08	1	Basking	Large	Same location as on 18 Jul 08 survey
Prospect Lake Rd Pond 1	07-Aug-08	1	Swimming	Large	The landowner had previously seen a turtle on land in field
Thetis Lake (Upper)	08-Jun-08	7	Feeding/basking	Large	
	11-Sep-08	4	Basking	Large	All on one log; one very large (2x others); Cooter?
<u>Vancouver Island, Nanaimo:</u>				Large	
Buttertubs Marsh	28-Jul-08	2	Basking	Large	Along vegetated shoreline
	28-Jul-08	5	Swimming	Large	
Westwood Lake	28-Jul-08	1	Basking	Large	
<u>Vancouver Island, Alberni Valley:</u>					
Loon Lake	13-Aug-08	1	Basking	Large	
	13-Aug-08	2	Swimming	Large	

4.2.3 Nesting Areas

We located turtle nesting sites at four localities: in Elk/Beaver Lake and Matheson Lake Regional Parks (see Section 4.3, below for details of nesting sites within CRD Regional Parks) and at “Airport Wetlands” and Devil’s Den Lake in the Alberni Valley. At the “Airport Wetlands” on 12 August 2008, we located “test” holes and disturbed, undisturbed, and emerged nests at two locations near a marshy lake inhabited by the Western Painted Turtle. Disturbed nests included dug out holes and shriveled up eggs on the surface, probably as a result of predation. One of these sites was in a gravel pit about 50 m from the northwest corner of the lake and across a logging road. We also found turtle nests about 50 from the southwest corner of the same lake, along and on sides of an overgrown, old logging road. To get to this site from the lake turtles had to cross a logging road. At Devil’s Den Lake, we found test holes and recent nest sites at the base of a bluff in a natural opening on the north side of the lake, adjacent to a shallow weedy bay. Another site with a test hole and a recent turtle nest was farther up on the slope of the same bluff, about 50 m away. We found no turtles in the lake during the visit on 13 August 2008. However, on 22 September 2008, Rick and Libby Avis found 12 Western Painted Turtles of various body sizes basking on logs, suggesting that the nests were of this species (Table 3).

4.2.4 Sightings Reported by the Public and Other Observers

The public, landowners, and other observers reported to us additional observations of turtles from the study area. Identification of turtles could be confirmed in 13 cases, where photographs were taken or where the observations were by people knowledgeable about turtles (Table 3). These reports revealed the presence of the Western Painted Turtle at three additional sites in CRD on Vancouver Island (Maltby Lake, McKenzie Lake, and Eagles Lake) and at Devil's Den Lake in the Alberni Valley, and the Red-eared Slider at three sites (Table 1).

Table 3: Confirmed reports from the public or landowners of Western Painted Turtles and Red-eared Sliders.

Confirmation of identification was from photos or site visits. All localities are on Vancouver Island.

Region or district	Location	Land Ownership	New record for site	Notes
<u>Western Painted Turtle:</u>				
Highlands	Eagles Lake	Private	Y	Photos
Langford	Langford Lake	Private	N	Photos
Metchosin	East Sooke Road	Private	N	Photos; Reportedly found on road and released in Beaver Pond
Metchosin	Matheson Lake	CRD Regional Park	N	Photos & knowledgeable observers
Vancouver Island: Saanich	Beaver Lake	CRD Regional Park	N	Hatchling dead on road on Beaver Lake; knowledgeable observer Rd by ponds
Saanich	Maltby Lake	Private	Y	Turtle near the shore; photos form April 2006
Saanich	McKenzie Lake	Private; CRD Regional Park	Y	Nesting in gravel driveway; photo & knowledgeable observer
Alberni Valley	Devil's Den Lake	Private forestry	Y	12 turtles basking on logs on 22 Sep-08 by photo & knowledgeable observers
<u>Red-eared Slider:</u>				
Central Saanich	Hovey pond	Private	Y	Dug-out pond; verified by CE
Highlands	Matson Lake	Private	Y	Verified by CE
Langford	Langford Lake	Private	N	Nesting
View Royal	Thetis Lake	Park	N	Large turtle seen on land, Cooter?
Mayne Island	Dallagher-Bay Rd	Private	Y	Brought to rescue center
Saanich	Beaver Lake	CRD Regional Park	N	At beach parking lot
Saanich	Durrell Creek	Private	Y	In dug-out pond

4.3 Capital Regional District Regional Parks

4.3.1 Distribution

We surveyed all larger water bodies and some ponds within five CRD Regional Parks or Park Reserves (Table 4). The Western Painted Turtle was found in ponds and lakes in the Elk/Beaver Lake Park and in Matheson Lake. One of us (CE) had encountered this species at Durrance Lake, Mount Work Regional Park, in 2005; however, repeated surveys in 2008 were unsuccessful in relocating it at this site. The species has previously been found in McKenzie Lake, which is partially surrounded by private lands, but we did not locate it during one survey at this site. We found the non-native Red-eared Slider in the Elk/Beaver Lake, Matheson Lake, Mount Work (Durrance Lake) and Thetis Lake Parks. We did not find any turtles in the backcountry lakes within Sea to Sea Green Blue Belt Regional Park Reserve.

Table 4: Survey results for water bodies within CRD Regional Parks.

See Appendix 2 for survey dates

*CHPI – Western Painted Turtle, *Chrysemys picta*; TRSC – Red-eared Slider, *Trachemys scripta*

Location	Landscape context	Turtle species observed*	Availability of basking sites	Nesting grounds	Comments
<u>Elk/Beaver Lake RP:</u>					
Beaver Lake	Rural	CHPI; TRSC	Low	Potential	
Beaver Ponds (East Pond)	Rural	CHPI	Low	Confirmed	
Beaver Ponds (West Pond)	Rural	CHPI, TRSC	Low	Confirmed	
Elk Lake	Rural	TRSC	Low	Potential	
<u>Matheson Lake Regional Park:</u>					
	Rural	CHPI, TRSC	High	Confirmed	
<u>Mount Work Regional Park:</u>					
Durrance Lake	Rural	TRSC	Moderate	Confirmed	CHPI (1 ind.) was observed in 2005; nesting
Fork Lake	Rural	None	Low	Potential	
Killarney Lake	Rural	None	Low	None identified	
<u>Sea to Sea Green Blue Belt Regional Park Reserve:</u>					
Crabapple Lake	Backcountry	None	High	None identified	
Grass Lake	Backcountry	None	Moderate	None identified	
Pond btw Shields & Grass Lake	Backcountry	None	High	None identified	
Shields Lake	Backcountry	None	Moderate	None identified	
<u>Thetis Lake Regional Park:</u>					
McKenzie Lake	Rural	None			Previous report of nesting CHPI on private land
Prior Lake	Rural	None	Low	None identified	Reports of turtles from park users
Thetis Lake (Lower)	Rural	None	Low	Potential	
Thetis Lake (Upper)	Rural	TRSC	Moderate	Potential	

4.3.2 Nesting Areas in CRD Regional Parks

We identified turtle nesting areas in Elk/Beaver Lake and Mattheson Lake Parks. At Elk/Beaver Lake, we observed Western Painted Turtles digging nests at two sites by the Beaver Ponds on the west side of the lakes. In addition, on 6 June we found a hatchling by the north end of the main beach at the east side of Beaver Lake but could not locate signs of nesting in nearby areas.

By the Beaver Ponds, one nesting area was located along a sparsely vegetated bank sloping down to the pond (East Pond) and was used communally by many females. We found 12 nests (new, emerged, and disturbed) on a south-facing slope within 20 m from the water's edge within an area of about 12 m x 10 m (Figure 2). From 20 June to 1 July 2008, we observed five female Western Painted Turtles digging nests at this site and found five additional nests deemed to be from this year. One new nest, found on 27 June, was complete but uncovered, suggesting that the turtle had been disturbed before covering of the nest. Three other nests were disturbed and dug out, probably by a dog or a wild predator. On 19 June, we recorded four nests that had hatched and emerged. The nests were identified by a small square hole dug by the hatchlings. We excavated two of these nests and found remains of egg-shells. Emergence probably occurred in the spring rather than in the previous fall, as winter rains most likely would have collapsed the holes. Turtles have been using this site for many years, as evidenced by many old and emerged nests. One of us (KO) saw a Western Painted Turtle digging a nest here in June 2005. Observations of nesting females at the Beaver Ponds occurred between 16:30 and 21:00 h; most were in the evening after 19:00 h. We did not see females on land during visits earlier in the day.

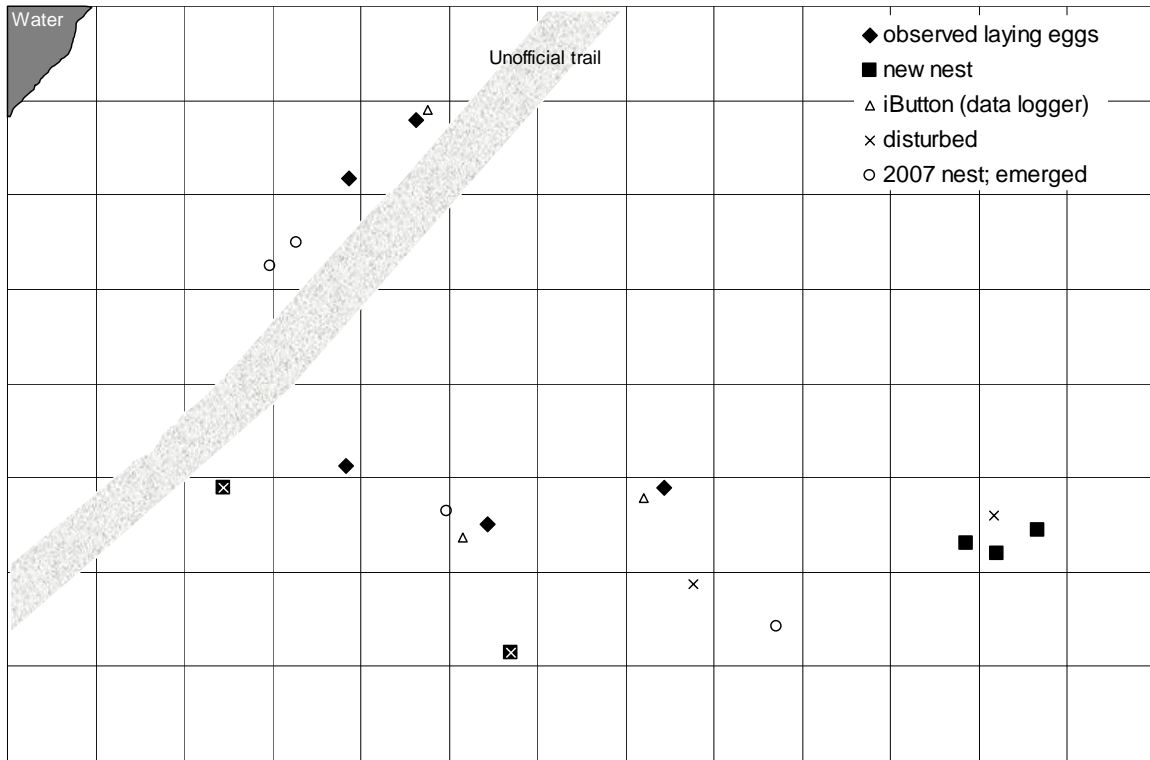
We found a second nesting site by the Beaver Ponds along the side of a gravel driveway leading to the maintenance house, where we saw a female Western Painted Turtle digging a nest at about 19:00 h, 20 June 2008. We also found several test holes at this site. The nearest pond was on the west side of the gravel access road (West Pond), about 50 m away, and a turtle was seen crossing the road near this site by park visitors.

One of us (KO) has previously seen nesting activities in another area by the Beaver Ponds. This site is along the side of gravel path on the north side of the trail, north of the horse training ring. A park visitor and retired biologist who walks in the area almost daily had seen turtles nesting at the same location in the past. However, like us, he had seen no turtle nesting activity there in 2008. Previous sightings of nesting behaviour of turtles also exist from near the filter bed at the south end of Beaver Lake (observation by A. Foster reported to M. Fuchs, pers. comm.).

Park visitors reported observations of hatchling turtles from three areas: A visitor saw a hatchling crossing the trail on the east side of Beaver Lake (470950E, 5373175N; reported to M. Fuchs); another visitor saw a hatchling on the east side of Beaver Lake by the 1 km mark (reported to K. Paige); two Western Painted Turtle hatchlings were found dead on Beaver Lake Road by the entrance to the Beaver Ponds in June, 2008 (C. Copley, pers. comm.).

At Matheson Lake, we located a turtle nesting area on a sparsely vegetated slope with a southern exposure on a small island (aspect: 156°; slope 20°). On 23 July 2008, we found six disturbed nests, including eight rotting eggs in one nest, one undisturbed nest, and four “test” holes on this slope. Both the Western Painted Turtle and Red-eared Slider inhabit the lake, and could be using this area. The decaying eggs were relatively small, suggesting the Western Painted Turtle, but their identity remains unconfirmed, as there is overlap in egg size between the two species.

Figure 2: Map of Western Painted Turtle nesting grounds at Beaver Ponds, Elk/Beaver Lake Regional Park, in 2008. (Grid cells are 1x1 m²). The trail shown is small and unofficial.



To monitor temperature and moisture conditions at the nesting grounds, we installed small data loggers (iButtons; model DS1923-F5) by three nests at Beaver Ponds on 14 July 2008 (Figure 2) and by one nest at Matheson Lake on 23 July 2008. As recommended by the Ministry of Environment draft standards (Hughes 2008), we placed the data loggers 25 cm from a recent nest at the depth of 10 cm, the average depth of a Western Painted Turtle nest. The iButtons were programmed to record temperature and humidity every hour for one year. They will provide information on conditions experienced by eggs and hatchlings in the nests and will be collected in May of 2009.

4.3.3 Habitat Enhancement

There were few basking sites for the Western Painted Turtle at the Beaver Ponds apart from the banks, where they were subject to disturbance by people and dogs. One end of the East Pond formerly contained many floating logs that the turtles used (KO, pers. obs), but these logs were no longer there in 2008 and had probably become water-logged. On 14 July 2008, we installed one artificial basking log to the East Pond and two to the West Pond. Each consisted of a weathered board (5 cm x 30cm x 122 cm), anchored to the bottom of the pond. We did not see turtles on the boards during three brief subsequent checks. Wood ducks were on the boards during two checks. The boards are likely to be more effective for turtles in the spring and early summer when air temperatures are lower and turtles seem to bask more.

5.0 Discussion

During the 2008 field-season, we found the Western Painted Turtle at several water bodies within the CRD region on Vancouver Island, including regional parks, and in the Alberni Valley. There were no confirmed observations of the species from Galiano and Pender Islands, and no reports from Saturna and Mayne Islands. There are no permanent natural water bodies on Mayne Island, which suggests that any turtle found on this island is most likely introduced. There is still a possibility that the Western Painted Turtle occurs in Laughlin Lake or other water bodies on Galiano Island, considering many beaver-maintained wetlands throughout the island. There are several anecdotal reports of unidentified turtles from the island that require verification. On North Pender, residents reported sightings of turtles from Magic Lake, but their identity remains unknown. Records of the Western Painted Turtle exist from other Gulf Islands. There are old records from Texada Island (McTaggart Cowan 1938, Carl 1952) and recent records from St. Mary's Lake on Saltspring (H. Atkin, pers. comm.), from Greenburn Lake on South Pender (T. Columbia, pers. comm.), and an unconfirmed sighting from a small lake on Quadra Island ("Little Morte" Lake; K. Paige, pers. comm.).

Within the CRD region on Vancouver Island, we found the Western Painted Turtle in ponds and lakes within urban and rural settings. We did not detect turtles in the backcountry lakes surveyed (Shields, Grass, and Crabapple Lakes in Sooke), although the habitat appeared suitable. The non-native Red-eared Slider was widespread within the study area, as a result of release of unwanted pets. Furthermore, people encountering turtles on land have a tendency to move them to new locations, sometimes far from the capture site. DNA analysis is needed to determine the indigenous or introduced status of individual populations of the Western Painted Turtle. In the absence of such information, a prudent assumption is to consider all existing populations native, unless there is direct evidence to the contrary.

The issue whether populations of the Western Painted Turtle west of the Coast Mountains in British Columbia are native or a result of recent introductions has been debated for many decades (McTaggart Cowan 1938; Carl 1952, COSEWIC 2006). McTaggart Cowan (1938) reported that turtles in this region occur at least at Pender Harbour, Texada Island, and the Port Alberni area, including wilderness lakes that were far from populated areas. He also drew attention to notes by Lord of turtles on Vancouver Island in 1858. Similarly, Carl (1952) believed that Western Painted Turtles, at least in Patterson Lake and other small lakes in the vicinity of the Great Central Lake in the Port Alberni, area were indigenous. COSEWIC (2006) determined that the Pacific Coast Population of the species is native to the area and designated it as endangered.

The Western Painted Turtle still occurs in Patterson Lake, and we also located it at two other nearby lakes (Little Turtle Lake and "Airport Wetlands") in the Alberni Valley. It also occurs in Devil's Den Lake. The populations in the Port Alberni area are of particular interest for study, monitoring, and conservation due to their long documented history and indigenous status.

6.0 Threats and Management Recommendations

6.1 CRD Regional Parks

6.1.1 Threats

Main threats to the Western Painted Turtle include disturbance from recreational activities and pets, exotic species, and road mortality (Table 5). Clearing of aquatic weeds may also harm turtles caught in the machinery at Elk and Beaver Lakes, but more information is needed. Threats for McKenzie Lake turtles could only be assessed tentatively, as much of the lakeshore is on private lands and was not accessed.

At both Elk/Beaver Lake and Matheson Lake Parks, greatest threats to turtles are from disturbance caused by recreational activities and pets, particularly on nesting grounds. Turtles are most vulnerable to accidental mortality, harassment, and disturbance while nesting or traveling to and from nesting grounds (COSEWIC 2006). Suitable warm nesting areas are often in short supply and probably limit the distribution of the Western Painted Turtle, particularly within the northern part of the species' range.

The Beaver Ponds nesting ground at Elk/Beaver Lake is within an area that receives much recreational use. It is used for retriever training, dog walking, and hiking. These activities often take place in the evening after people leave work, corresponding to times of day when turtles are nesting. Disturbance to hatchlings may also occur when leaving nests, presumably in the spring, but little information is available on the timing of emergence and potential conflicts with human use of the area. At Matheson Lake, the nesting ground is located within a small area that receives heavy day use by visitors that swim and paddle on the lake. Human presence and trash may also draw nest predators, such as raccoons and rats, to the site. Trash left behind by visitors was found at the site, as well as in disturbed nests.

Exotic species pose a threat to the Western Painted Turtle in both parks. The Red-eared Slider co-occurred with the Western Painted at all sites within CRD Regional Parks where the latter was found. At Beaver Ponds, we found only the Western Painted Turtle during numerous visits until 12 September, when we saw a Red-eared Slider in the West Pond for the first time. The two species may compete for basking or nesting sites. The larger Red-eared Sliders might displace the Western Painted Turtle, but direct evidence is lacking. The non-native Bullfrog is present in water bodies of most CRD Regional Parks, including Elk/Beaver Lake and Matheson Lake. Beaver Ponds at Elk/Beaver Lake Park support an abundant population of bullfrogs. Adult bullfrogs are notoriously voracious predators and take a variety of prey. They at least occasionally prey on hatchling turtles (Korschgen and Baskett 1963, McKamie and Heidt 1974).

Road mortality during migrations between nesting grounds and aquatic habitats is one of the main sources of mortality for many turtle populations, including Western Painted Turtle in the interior of BC (COSEWIC 2006). Road mortality is probably not a significant threat to the Western Painted Turtle in the Elk/Beaver Lake and Matheson Lake Parks, as access to confirmed or potential nesting grounds does not require crossing major roads. However, some mortality of adult females or hatchlings may occur for those turtles nesting along the driveway or gravel access road near Beaver Lake Road. Two hatchlings of the Western Painted Turtle were found dead on Beaver Lake Road, adjacent to the park, as reported to us. One of us (KO) saw an adult turtle (species undetermined) killed on the Pat Bay Highway adjacent to Elk Lake several years ago. Loss of even a few adult females to road mortality or collection as pets could be significant

to populations of these long-lived animals. The prevalence and implications of road mortality to populations of the Western Painted Turtle requires further investigation, particularly at Elk/Beaver Lake.

Table 5: Threat assessment at sites within CRD Regional Parks where the Western Painted Turtle was found or known to occur

Location	Roads	Recreation (motorized)	Recreation (non-motorized)	Pets	Exotic species	Other
<u>Elk/Beaver Lake Regional Park:</u>						
Beaver Lake	Low	No	High	High	High	Aquatic weed clearing
Beaver Ponds (East Pond)	Low	No	High	High	High	No
Beaver Ponds (West Pond)	Moderate	No	Moderate	Moderate	High	No
Elk Lake	Low	High	High	High	High	Aquatic weed clearing
<u>Matheson Lake Regional Park:</u>	No	No	Moderate - High	No	High	No
<u>Mount Work Regional Park:</u>	No	No	High	Low	High	No
Durrance Lake						
<u>Thetis Lake Regional Park:</u>	Low?	Low	Low-Moderate	?	?	Residential
McKenzie Lake						

Collection of turtles for pets or other unauthorized purposes may be a threat to turtles in CRD Regional Parks and in other accessible sites. We found a turtle trap in a pond in Beckwith Park (a Saanich municipal park) with a dead Red-eared Slider in the immediate vicinity. The extent of collection activities in CRD Regional Parks is unknown.

6.1.2 Mitigation and Monitoring Measures

We recommend the following measures for mitigating threats to turtles in CRD Regional Parks:

Reduce disturbance of nesting turtles

- This could be accomplished by restricting human access to identified communal turtle nesting grounds during the nesting period from mid-May to early July, particularly in the evenings.
- At Matheson Lake, fencing and signage could be used at the small island where nesting occurs to discourage access by visitors.
- At Beaver Ponds at Elk/Beaver Lake Park, diverting an unofficial path that traverses the nesting ground is an option. Temporary fencing might be considered during nesting season for the small area of the old-field habitat where the turtles are nesting. Information pamphlets to retriever training and riding clubs using the area would also be helpful.

Monitoring road mortality

- At Elk/Beaver Lake, road surveys are recommended during the peak nesting season in June – early July in early morning and/or evenings. The surveys should focus on:

- Beaver Lake Road and the gravel access road to the park
- Parking lots and access roads to the main beach area and to the dog off-leash area
- The stretch of highway east of Elk Lake that parallels the lake
- Encouraging park users to report any road mortalities of turtles in the vicinity of the park is recommended.
- If significant mortality is found, mitigation options suitable for each particular situation can be assessed. Options include signage, speed limits, temporary road closures, and/or use of fencing to direct turtles away from danger areas.

Monitor effects of aquatic weed removal on turtles

Elk and Beaver Lakes are periodically subjected to removal of submerged vegetation using aquatic weed control machinery. At Langford Lake, the operator of similar machinery reports catching turtles at the rate of up to 6 per hour in some areas of the lake. The turtles appeared to be unharmed and were released immediately. However, the effects on turtles of being caught in the machinery are unknown. We recommend that a biologist is present when weed removal takes place to assess harm to turtles and advise the operator of information to be collected.

6.2 Other Areas within CRD

Outside parks, much of turtle habitat within the CRD is privately owned. Loss and degradation of aquatic habitats and terrestrial nesting areas as a result of urban development are the greatest threat to turtle populations in these areas. During the surveys, we noted new housing developments immediately adjacent to wetlands containing high suitability habitat for turtles. General measures for protecting wetlands from loss and degradation apply. For private landowners living next to water, these measures include preventing pollutants from entering water bodies by keeping septic tanks in good working order and avoiding using pesticides and herbicides. See Appendix 3 for threat assessment for the sites surveyed in 2008.

In areas where the shoreline is developed, suitable nesting sites for turtles often exist only on lawns and open areas in people's backyards. In these situations, residents can help by ensuring that their properties remain accessible to turtles. At Langford Lake, for example, we noticed that many properties contained low retaining walls at the shoreline. These walls pose barriers to females attempting to enter nesting grounds. Residents can help by ensuring that people and pets do not harass turtles while on land during the nesting season in June-early July. They can also help by reporting their observations of turtles, nesting attempts, and road kills.

Similar to Elk and Beaver Lakes in CRD Regional Parks, aquatic weed removal occurs in Langford Lake and possibly in other larger lakes as well. Monitoring turtles caught in the machinery is required at these sites, preferably with the help of a biologist.

6.3 Alberni Valley

In the Alberni Valley, the Western Painted Turtle occupies several lakes and wetlands within privately owned forestry lands. These populations are important to conserve as they are most likely native, in contrast to some populations in developed areas that may be introduced. Forestry activities and trapping of beavers are probably the most important anthropogenic factors affecting turtle habitats and populations in this area. Removal of trees around wetlands is likely to increase the probability of complete drying of shallow-water areas occupied by turtles during

dry summers, decreasing habitat suitability. Similarly, trapping of beavers has resulted in the shrinkage and loss of open water areas from some wetlands and shallow lakes.

Traffic on logging roads close to water bodies can result in road mortality of turtles, especially where nesting grounds are located across the road from water bodies or along road sides, such as at the "Airport Wetlands" where we found turtle nesting grounds across the road from the lake. Disturbance of nesting grounds by humans and nest predators was also noted at one of the nesting sites at the edge of a gravel pit. This site had been used for unauthorized shooting practice and was littered with trash, which likely attracts nest predators to the area.

Management recommendations include protecting identified nesting grounds at the "Airport Wetlands" site from disturbance by blocking public access to the nesting grounds during June – early July. The prevalence of road mortality should be monitored at this site during the nesting period. Identification of nesting grounds at other sites where the Western Painted Turtle occurs is also needed, so that these sites can be protected. Other management actions include preventing in-growth of wetlands with vegetation and maintenance of open water areas in shallow water bodies. This may include allowing beavers to build dams and alter water levels and leaving forested buffers around all wetlands during logging operations. Controlling spread of non-native species, particularly bullfrogs and Red-eared Sliders, is also imperative.

7.0 Recommendations for Studies in 2009

7.1 CRD Regional Parks

- Continuation of survey efforts:
 - Resurvey sites with suitable habitat that were visited infrequently or only once in 2008
 - Identify and survey additional water bodies, including smaller wetlands
 - Identify additional nesting areas at Elk/Beaver Lake and Matheson Lake parks
- Monitoring known nesting sites:
 - Systematic surveys of nesting areas at Beaver Ponds and other identified nesting areas to determine timing of nesting and numbers of females using these sites; determine timing of hatchling emergence from the nest
- Monitoring movement patterns of turtles:
 - Telemetry study of habitat use and movement patterns at sites with Western Painted Turtle and visitor-turtle interactions
- Clarification of threats:
 - Systematic surveys for road kill at Elk/Beaver Lake Regional Park
 - Disturbance to turtles caused by park users, at nesting sites and in the aquatic habitat through monitoring nesting areas and visitor turtle interactions
 - Document turtle catch and potential threats from aquatic weed removal
- Application of protective measures to known nesting areas and monitoring of their effectiveness (see Section 6.1 for mitigation options for reduce disturbance to nesting turtles)

7.2 Other Areas on Vancouver Island and Gulf Islands

- Revisit sites with suitable habitat that were surveyed only once during the 2008 field season. Multiple visits to sites are required to infer absence with reasonable certainty.
- Expand survey effort in the Port Alberni area and the Gulf Islands (e.g., Valdes, Quadra, Gabriola and Saturna Islands)
- Expand survey coverage of water bodies on Vancouver Island to new areas to the southwest of CRD (e.g., Port Renfrew area) and north along the southeast coast (e.g., Duncan, Nanaimo, and Courtnay areas)
- Continue working with conservation groups in target areas
- Continue developing relationships with landowners in wetland habitats and involving them in stewardship and monitoring activities

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8.0 Personal Communications

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9.0 Appendices

Appendix 1: Location and habitat at sites surveyed for turtles in 2008

All UTM coordinates are from Zone 10 U (NAD 83 datum); the coordinates were recorded for the approximate center of the water body.

ID #	Location	UTM easting	UTM northing	Ownership	Landscape context	Upland habitat	Wetland type	Wetland perimeter (km)	Emergent veg. (% perim.)	Forest (% perim.)	Shrubs (% perim.)	Grass/herbs (% perim.)	Shoreline developed (% perim.)	Basking logs	Nesting grounds	Comments on habitat
Galiano Island:																
1	Cook Rd wetland	458844	5426266	BC Crown	Rural	Mixed-wood forest	Marsh-pond	0.99	30	90	5	5		High		Beaver maintained wetland complex in valley; logged strip on steep side; lots of dead standing & down logs
2	Devina Dr. Ponds	457927	5426774	Private	Rural	Coniferous forest	Marsh-pond	1.84	5	50		10		High	None identified	Elongated wetland along road with thin line of trees; beaver maintained with dead standing & down logs; WRcedar, DF, Arbutus forest
3	Ecological Reserve 128, beaver ponds along road	459218	5425585	Private	Back-country	Agricultural	Marsh-pond	2.52	20	80	20			Moderate		Douglas-fir/arbutus forest; beaver maintained wetland complex growing in with hardhack & sedges; small patches of open water
4	Findlay Lake	474259	5416506	Covenant & Galiano Conservancy) on private land	Back-country	Mixed-wood forest	Lake	0.85	70	90	10			High	None identified	Dam built in the 1940s; beaver maintained; many dead standing & down trees in water; water lilies
5	Great Beaver Swamp	465062	5421077	Private	Rural	Mixed-wood forest	Pond	1.94	5	90	10			High	None identified	Large pond recently expanded by beaver activity; many standing snags
6	Laughlin Lake	462937	5422006	(Covenant HAT & Trust Fund Board) on private land	Rural	Mixed-wood forest	Lake	1.41	5	90	5	5		Moderate	Potential	Mostly coniferous forest (DF, WRcedar, few BL maples); beaver maintained wetland
7	Therah ponds	458295	5427355	Private	Rural	Mixed-wood forest	Pond	0.79	90	100				Low	None identified	Beaver maintained wetland

ID #	Location	UTM easting	UTM northing	Ownership	Landscape context	Upland habitat	Wetland type	Wetland perimeter (km)	Emergent veg. (% perim.)	Forest (% perim.)	Shrubs (% perim.)	Grass/ herbs (% perim.)	Shoreline developed (% perim.)	Basking logs	Nesting grounds	Comments on habitat
<u>North Pender Island:</u>																
8	Buck Lake	477906	5402276	Private	Rural	Mixed-wood forest	Lake	1.36	5	90	5	5	95			Some turtle habitat in shallow weedy bays & around island
9	Canal Road	480500	5101500	Private	Rural	Agricultural	Pond	0.12	10			100		None		
10	Clam Bay Rd Pond	477900	5407000	Private	Rural	Agricultural	Pond	0.31		10	40	40	10	Moderate	Potential	
11	Corbett Road	478700	5405800	Private	Rural	Agricultural	Pond	0.39	10	10	60	10		None		Lots of junk on uplands
12	Gardom Pond	481626	5402523	Private	Rural	Coniferous forest	Pond	0.42	90	60	30		1	None	None identified	Modified from original marshland; abundant pond lilies & Potamogedon; forest; surrounded by cat tails & tall rushes; mowed grass by access road
13	Liberto Rd	479000	5403000	Private	Rural	Agricultural	Pond	0.64	10	50		50		High	Potential	
14	Magic Lake	479000	5401000	Private	Rural	Mixed-wood forest	Lake	2.63	5		10	5	90	Moderate	None identified	Shallow weedy bays with pond lilies mainly at NW end of lake (Schooner Way); some at east end and in middle
15	Otter Bay Rd Pond 1	477000	5406000	Private	Rural	Golf course	Pond	0.36	10	50	60	10		Low	Potential	
16	Otter Bay Rd Pond 2	477000	5406000	Private	Rural	Agricultural	Pond	0.29	20					Low	Potential	
17	Pond at Hamilton Beach	479739	5402394	Private	Rural	Beach & mixed-wood forest	Pond	0.31	90	30	50	5	20		Potential	Beaver activity; pond growing in, surrounded by tall reeds, grass & shrub fringe; shallow, stagnant
18	Pirates Rd Pond 1	481500	5399000	Private	Rural		Pond	0.09							None identified	Series of small human-modified or dug out ponds amidst lawns & pastures; intensively used
19	Tindel Wood Estate	480500	5404000	Private	Rural	Coniferous forest	Pond	0.21	0	100				Low	None identified	

ID #	Location	UTM easting	UTM northing	Ownership	Landscape context	Upland habitat	Wetland type	Wetland perimeter (km)	Emergent veg. (% perim.)	Forest (% perim.)	Shrubs (% perim.)	Grass/herbs (% perim.)	Shoreline developed (% perim.)	Basking logs	Nesting grounds	Comments on habitat
<u>Vancouver Island, CRD (Central Saanich):</u>																
20	Durrance Lake	464688	5377358	CRD Regional Park	Rural	Coniferous forest	Lake	1.80	5	40	55		5	Moderate	Confirmed	
36	Hagan Creek Pond 1	468000	5384000	Private	Rural	Deciduous forest	Pond		100		95		5	Low	None identified	
21	Hovey Rd Pond	467000	5381000	Private	Rural	Deciduous forest	Pond	0.40	20	40	50	5	5	None	Confirmed	
<u>Vancouver Island, CRD (Highlands):</u>																
22	Eagles Lake	465778	5372975	Park	Rural	Coniferous forest	Lake	1.37	<5	45	45			Low	Potential	
23	First Lake	462695	5373370	Private	Rural	Coniferous forest	Lake	1.29	10	15	80	1	5	Moderate		Lake dammed at south end
42	Fork Lake	464125	5374228	CRD Regional Park & private	Rural	Coniferous forest	Lake	1.10	5-50	10	40		50	Low	Potential	
24	Matson Lake	462050	5370668	Private	Rural	Coniferous forest	Pond	1.32	51-95	5	51-95		5	Moderate	Potential	
25	Munn's Road Pond 1	466000	5371000	Private	Rural	Old field-mixed-wood	Pond	0.29					90	None	None identified	Shorelines highly developed; small pond used for water sports
26	Pease Lake	463268	5377041	Private	Rural	Coniferous forest	Lake	1.00	10	85	10		5	Moderate	None identified	Good basking habitat at west end of lake with logs and lily pads
27	Second Lake	463005	5374508	TLC private	Rural	Coniferous forest	Lake	1.32	50	75	20	0	5	Moderate	Potential	
28	Second Lake, backwaters	462874	5374076	Private	Rural	Coniferous forest	Pond	0.69	80	20	80	5		High	Potential	Excellent turtle habitat; wetland adjoining Second Lake to the north
29	Teanook Lake	462448	5370719	Private	Rural	Coniferous forest	Lake	0.93	5-50	50	40		10	Low	Potential	
30	Third Lake	463115	5375403	Private	Rural	Coniferous forest	Lake	1.24	10	60	35		5	Low	Potential	
<u>Vancouver Island, CRD (Langford):</u>																
31	Florence Lake	462106	5367426	Private	Urban	Mixed-wood forest	Lake	1.84	75	5	90	5	5	Low	None identified	
32	Glen Lake	461332	5365058	Private	Urban	Coniferous forest	Lake	2.03	3	20				Moderate	Potential	One small patch of a swamp next to lake, otherwise very built up

ID #	Location	UTM easting	UTM northing	Ownership	Landscape context	Upland habitat	Wetland type	Wetland perimeter (km)	Emergent veg. (% perim.)	Forest (% perim.)	Shrubs (% perim.)	Grass/ herbs (% perim.)	Shoreline developed (% perim.)	Basking logs	Nesting grounds	Comments on habitat
33	Kettle Pond	459856	5367034	Private	Rural	Disturbed & Pond developed		0.62	30					None	None identified	Wetland oasis surrounded by roads, buildings, development, and gravel/sand extraction; abundant cat tail along shores; just north of Langford Lake
34	Langford Lake	460686	5366651	Private	Urban	Mixed-wood Lake forest		5.03	10		40	10	50	Low	Confirmed	
<u>Vancouver Island, CRD (Metchosin):</u>																
35	Matheson Lake	455452	5356928	CRD Regional Park	Rural	Coniferous forest	Lake	3.36	<50	45	50		1	High	Confirmed	Turtle habitat in shallow weedy bays, esp. at west end of lake
<u>Vancouver Island, CRD (Saanich):</u>																
37	Beaver Lake	470962	5373534	CRD Regional Park	Rural	Mixed-wood forest	Lake	3.61	<5		90	5		Low	Potential	
38	Beaver Ponds (East Pond)	470521	5373077	CRD Regional Park	Rural	Old field-mixed-wood	Pond	0.56	80		100			Low	Confirmed	Shallow, weedy stagnant pond (one of 4 ponds); Basking logs include an installed turtle board
38	Beaver Ponds (West Pond)	470717	5373073	CRD Regional Park	Rural	Old field-mixed-wood	Pond	0.42	90		70	30		Low	Confirmed	Shallow, weedy stagnant pond (one of 4 ponds); Basking logs include 2 installed turtle boards
39	Beckwith Park	472743	5369846	Park (Saanich)	Urban	Garry oak woodland	Pond	0.50	5	<5	80	5	5	Low		Cottonwoods in moist areas along ponds; 2 small ponds; Basking: few floating logs; shoreline banks
40	Blenkinsop Lake	473334	5370059	Park (Saanich)	Rural	Agricultural	Lake	1.66	90		90			Low	None identified	
41	Elk Lake	470352	5375493	CRD Regional Park	Rural	Mixed-wood forest	Lake	6.56	<5	10	85	1	2	Low	Potential	Floating logs & rhizome mats provide basking sites; bays with lily pads
43	Killarney Lake	466270	5375151	CRD Regional Park	Rural	Mixed-wood forest	Lake	0.76	5	95				Low	None identified	Deep clear lake; few weedy shallow areas for turtles
44	Maltby Lake	466568	5371645	Private	Rural	Coniferous forest	Lake	1.42	50	15	80		5	Low	Potential	Beaver activity (lodge); good turtle habitat with pond lilies & shallow areas

ID #	Location	UTM easting	UTM northing	Ownership	Landscape context	Upland habitat	Wetland type	Wetland perimeter (km)	Emergent veg. (% perim.)	Forest (% perim.)	Shrubs (% perim.)	Grass/herbs (% perim.)	Shoreline developed (% perim.)	Basking logs	Nesting grounds	Comments on habitat
45	Pond by Maltby Lake	466857	5371885	Private	Rural	Coniferous forest	Pond	0.77	60		95			Low	None identified	Connected to Maltby Lake by in-growing wetland, pond off Prospect Lake Rd
46	Prospect Lake	467075	5372989	Private	Rural	Mixed-wood forest	Lake	4.73	<1	60	15	5	70	Low	Potential	Residential development along almost entire shoreline; some turtle habitat in shallow weedy bays
47	Prospect Lake Pond 1	467000	5371000	Private	Rural	Agricultural	Pond	0.20	80	5	20	75	0	None	Potential	Overgrazed field
48	Swan Lake	472414	5367870	Park (Saanich)	Urban	Old field-mixed-wood	Lake	2.04	10		99			Low	None identified	All turtles in west end of lake
<u>Vancouver Island, CRD (Sooke):</u>																
49	Crabapple Lake	451527	5367990	CRD Regional Park	Back-country	Coniferous forest	Lake	1.42	70	10	80	10		High	None identified	Surrounding forest has been logged 30-50 years ago; old dock on lake
50	Grass Lake	449805	5366070	CRD Regional Park	Back-country	Coniferous forest	Lake	3.84	<50	90	10			Moderate	None identified	Extensive shallow wetlands in west side of lake - good turtle habitat; in-growing with vegetation
51	Pond between Shields & Grass Lake	450438	5366232	CRD Regional Park	Back-country	Coniferous forest	Pond	0.29	10	50	50			High	None identified	Small weedy pond with good turtle habitat; part of wetland system connected to Grass Lake
52	Shields Lake	450868	5366389	CRD Regional Park	Back-country	Coniferous forest	Lake	2.88	<50	95	5			Moderate	None identified	Several weedy shallow water areas suitable for turtles
<u>Vancouver Island, CRD (View Royal):</u>																
53	Hydro Pond	466000	5372000	Private	Rural	Powerline clearing	Pond	0.50						Moderate		Another pond east of the power station as well
54	McKenzie Lake	464439	5370036	Private & CRD Regional Park	Rural	Coniferous forest	Lake	2.12						Low?		
55	Prior Lake	4685454	5369386	CRD Regional Park	Rural	Coniferous forest	Lake	1.53	<50		100		1	Low	None identified	Deep lake; willow fringe in coniferous forest
56	Thetis Lake (Lower)	465266	5368375	CRD Regional Park	Rural	Coniferous forest	Lake	2.66	5	80	10		1	Low	Potential	Cliffs (10% of perimeter cover)

ID #	Location	UTM easting	UTM northing	Ownership	Landscape context	Upland habitat	Wetland type	Wetland perimeter (km)	Emergent veg. (% perim.)	Forest (% perim.)	Shrubs (% perim.)	Grass/ herbs (% perim.)	Shoreline developed (% perim.)	Basking logs	Nesting grounds	Comments on habitat
56	Thetis Lake (Upper)	464654	5368452	CRD Regional Park	Rural	Coniferous forest	Lake	4.39	50	5	90			Moderate		Cliffs (5% of perimeter cover); habitat for bay where turtles seen on north side of lake
<u>Vancouver Island, Nanaimo:</u>																
57	Buttertubs Marsh	429378	5447204	Park (local)	Urban	Deciduous fringe - residential	Marsh-pond	3.28	95		95			None	Potential	Weedy, shallow wetland pond
58	Morrell Lake	428090	5444654	Park (regional)	Urban	Coniferous forest	Lake	1.28	10	50	50			Moderate	Potential	Dammed pond in the west end of Westwood Lake Park
59	Westwood Lake	426448	5446344	Park (regional)	Urban	Coniferous forest	Lake	5.49	<5	>95	5	5	5	High	Potential	UTM where turtle seen at north end of lake; bay with fast currents & lots of standing & down trees
<u>Vancouver Island, Alberni Valley:</u>																
60	Airport wetlands	358400	5466114	Forestry-Private	Back-country	Coniferous forest	Lake	3.20	80	10	90			High	Confirmed	
61	Ash Main, at 6 km	362991	5457020	Forestry-Private	Back-country	Coniferous forest	Marsh-pond	0.37	100	50	50			Low	None identified	Shallow elongated wetland, growing in but areas of open water; beaver maintained
62	Canal Main, 2 km	363712	5457158	Forestry-Private	Back-country	Coniferous forest	Marsh-pond	1.15	70	15	75			Moderate	None identified	
63	Devil's Den Lake	364382	5457080	Forestry-Private & BC Crown	Back-country	Coniferous forest	Lake	1.53	80	30	70			Low?	Confirmed	Mainly coniferous with some alder & maple; beaver activity (2 lodges) on lake
73	Great Central Lake	339694	5470591	Forestry	Back-country	Coniferous forest	Lake			<50	<50	<5	<5	Moderate	Potential	Large dammed lake; some turtle habitat in shallow bays
64	Little Turtle Lake	358729	5464450	Forestry-Private	Back-country	Coniferous forest	Lake	1.67	50	30	40			High	None identified	
65	Loon Lake	376385	5457036	Forestry-Private	Back-country	Coniferous forest	Lake	1.17	60	30	70			Moderate	Potential	Mainly coniferous with some alder & cottonwood by shoreline
72	Lowry Lake	344767	5473795	Forestry-Crown?	Back-country	Coniferous forest	Lake		<50	<50	<50	<5	<5	High	Potential	Shallow perimeter, downed logs, muddy bottom in places, emergent vegetation

ID #	Location	UTM easting	UTM northing	Ownership	Landscape context	Upland habitat	Wetland type	Wetland perimeter (km)	Emergent veg. (% perim.)	Forest (% perim.)	Shrubs (% perim.)	Grass/herbs (% perim.)	Shoreline developed (% perim.)	Basking logs	Nesting grounds	Comments on habitat
66	Moran Lake	353130	5470211	Forestry-Private	Back-country	Coniferous forest	Lake	2.89			100			None	None identified	Surrounded by bog and growing in; recent logging all around
67	Patterson Lake	355369	5468105	Forestry-Private	Back-country	Coniferous forest	Lake	3.07						Moderate	None identified	Lake & wetland connections growing in with vegetation; boggy
68	Sumner Lake	355463	5469326	Forestry-Private	Back-country	Coniferous forest	Lake	2.41						Low	None identified	Connected to Turtle Lake through small ephemeral creek; recreation site at access point
69	Turtle Lake	357699	5465847	Forestry-Private	Back-country	Coniferous forest	Lake	3.85						Low	None identified	Surrounded by sphagnum bog
70	Tyler Rd Pond	361418	5458688	Private	Rural	Mixed-wood forest	Pond	0.45	80	20	75		5	Low	None identified	
71	Wetland west of Turtle Lake	357317	5466092	Forestry-Private	Back-country	Coniferous forest	Marsh-pond	2.33						Low		Shallow with little open water; growing in; beavers trapped here to prevent flooding of road
<u>Vancouver Island, Port Renfrew:</u>																
74	Dimple Lake	417248	5392275	Forestry-Crown?	Back-country	Coniferous forest	Lake			>50	<5	<5	<5	High	None identified	
75	Pixie Lake	411822	5382721	Forestry-Crown?	Back-country	Coniferous forest	Lake			>50	<5	<5	<5	High	None identified	
<u>Vancouver Island, Cowichan Valley:</u>																
76	Kissinger Lake	391592	5419306	Forestry-private	Back-country	Coniferous forest	Lake			<50	<50	<5	<5	High	None identified	

Appendix 2: Dates and weather conditions during surveys for turtles in 2008.

Observers: CE-Christian Engelstoft; KO-Kristiina Ovaska; KP-Kathy Paige; TC-Todd Carnahan; DM-David Manning; FM-Faye Morgensen

Site ID	Location	Date	Observers	Start time	End time	Survey method	Air temp (C)	Water temp (C)	Wind speed	Precip.	Cloud cover (%)	Species (turtle)	# of turtles seen	Bullfrogs (Seen; Heard)
Galiano:														
1	Cook Rd wetland	28-Aug-08	CE, KO	10:40	11:15	foot	17	18	Moderate	None	>50		0	No
2	Devina Dr. Ponds	28-Aug-08	CE, KO	15:10	15:35	foot	17		Moderate	None	100		0	No
3	Ecological Reserve 128, beaver ponds along road	28-Aug-08	CE, KO	10:15	10:32	foot	16	14	Light	None	100		0	No
4	Findlay Lake	28-Aug-08	KO, CE, Ken Millard	13:15	13:55	foot	16	16	Light	Drizzle	100		0	No
5	Great Beaver Swamp	27-Aug-08	KO, CE, Ken Millard	13:00	14:00	foot	20	19	Calm	None	<50		0	No
5	Great Beaver Swamp	05-Sep-08	CE, FM	14:38	15:35	boat, foot	19	22	Calm	None	>50		0	No
6	Laughlin Lake	27-Aug-08	KO, CE, Ken Millard	15:20	16:00	foot	22	22	Calm	None	>50	Unknown	4	No
6	Laughlin Lake	28-Aug-08	CE, KO	9:50	10:00	foot	16		Moderate	None	100		0	No
6	Laughlin Lake	28-Aug-08	KO, CE, Reiner Krueger	14:40	14:55	foot	17		Moderate	None	100		0	No
6	Laughlin Lake	05-Sep-08	CE, FM	12:40	14:30	foot	20	21	Light	None	>50	TRSC	5	
6	Laughlin Lake	05-Sep-08	CE, FM	12:40	14:30	foot	20	21	Light	None	>50	Unknown	1	
7	Therah ponds	27-Aug-08	KO, CE, Ken Millard	17:00	17:15	foot	17		Calm	None	>50		0	
North Pender:														
8	Buck Lake	24-Jun-08	KO, TC	10:30	11:00	boat	18	19	Light	None	>50		0	No
9	Canal Road	24-Jun-08	DM, CE										0	
10	Clam Bay Rd	24-Jun-08	DM, CE	10:30	11:00	foot			Moderate	None	>50		0	
11	Corbett Rd	24-Jun-08	DM, CE	17:00	17:15	foot			Calm	None	0	TRSC	1	No
12	Gardom Pond	24-Jun-08	KO, TC	15:45	16:00	foot	20			None	>50		0	No

Site ID	Location	Date	Observers	Start time	End time	Survey method	Air temp (C)	Water temp (C)	Wind speed	Precip.	Cloud cover (%)	Species (turtle)	# of turtles seen	Bullfrogs (Seen; Heard)
13	Liberto Rd	24-Jun-08	DM, CE	13:30	14:15	foot			Calm	None	0	TRSC	1	No
14	Magic Lake	24-Jun-08	KO, TC	11:15	12:20	boat	16	20	Moderate	None	>50		0	No
14	Magic Lake	24-Jun-08	KO, TC	16:43	17:50	boat	20	18	Calm	None	<50		0	No
15	Otter Bay Rd Pond 1	24-Jun-08	DM, CE	12:00	12:30	foot			Calm	None	0		0	
16	Otter Bay Rd Pond 2	24-Jun-08	DM, CE	17:00	17:30	foot			Calm	None	0		0	
17	Pond at Hamilton Beach	24-Jun-08	KO, TC	15:10	15:30	foot	18		Light	None	<50		0	No
18	Ponds off Shark Road	24-Jun-08	KO, TC	14:35	14:55	foot	18		Light	None	>50		0	No
19	Tindle Wood Estate	24-Jun-08	DM, CE	15:45	16:00	foot	20		Calm	None	0	TRSC	1	No

Vancouver Island, CRD:

37	Beaver Lake	06-Jun-08	CE	14:00		foot						CHPI	1	
37	Beaver Lake	07-Jun-08	CE	7:15	7:34	foot	9	17	Calm	None	<50	CHPI	3	
37	Beaver Lake	07-Jun-08	CE	7:15	7:34	foot	9	17	Calm	None	<50	TRSC	2	
37	Beaver Lake	22-Jun-08	FM, Emil Engelstoft, CE	7:30	9:00	boat						TRSC	1	
37	Beaver Lake	26-Jun-08	CE	7:00		foot							0	
37	Beaver Lake	7-Jul-08	KO	19:45	20:30	foot	21			None		CHPI	1	
37	Beaver Lake	23-Aug-08	CE, KO	13:50		foot	23		Calm	None	>50		0	No
	Beaver/Elk Lake	11 Sep-08	KP, John G.	17:10	18:15	boat			Calm	None	<50	CHPI	3	
	Beaver/Elk Lake	11 Sep-08	KP, John G.	17:10	18:15	boat			Calm	None	<50	Unknown	4	
	Beaver/Elk Lake	14 Sep-08	KP, John G.	15:00	15:45	boat			Calm	None	<50	Unknown	3	
38	Beaver Ponds	07-Jun-08	CE	8:15	8:30	foot							0	
38	Beaver Ponds	16-Jun-08	CE, KO	10:23		foot	20		Light	None	0	CHPI	2	
38	Beaver Ponds	16-Jun-08	CE, KO	11:22		foot	20		Light	None	0	CHPI	1	
38	Beaver Ponds	16-Jun-08	CE, KO	20:32	9:00	foot							0	
38	Beaver Ponds	19-Jun-08	CE	18:00	19:00	foot							0	
38	Beaver Ponds	20-Jun-08	CE, KO, Marilyn Fuchs, Pam Wesley	16:20	19:00	foot				None	<50	CHPI	1	
38	Beaver Ponds	21-Jun-08	CE	7:47		foot							0	
38	Beaver Ponds	27-Jun-08	KO	20:00	20:30	foot	21			None	<50	CHPI	1	
38	Beaver Ponds	28-Jun-08	KO	21:00	21:15	foot	21			None	<50		0	
38	Beaver Ponds	29-Jun-08	KO	20:15	21:30	foot	24			None	<50	CHPI	2	
38	Beaver Ponds	30-Jun-08	CE, KO	10:00	12:00	foot				None	<50		0	

Site ID	Location	Date	Observers	Start time	End time	Survey method	Air temp (C)	Water temp (C)	Wind speed	Precip.	Cloud cover (%)	Species (turtle)	# of turtles seen	Bullfrogs (Seen; Heard)
38	Beaver Ponds	30-Jun-08	KO	20:30	20:45	foot				None	<50		0	
38	Beaver Ponds	1-Jul-08	KO	20:30	20:45	foot	22			None	<50	CHPI	1	
38	Beaver Ponds	2-Jul-08	KO	20:30	20:45	foot				None	<50		0	
38	Beaver Ponds	4-Jul-08	KO	20:00	20:15	foot				None			0	
38	Beaver Ponds	5-Jul-08	KO	8:45	9:00	foot				None			0	
38	Beaver Ponds	7-Jul-08	KO	8:45	9:00	foot				None			0	
38	Beaver Ponds	7-Jul-08	KO	19:30	19:40	foot	21			None			0	
38	Beaver Ponds	14-Jul-08	CE, KO	10:30	13:00	boat				None			0	
38	Beaver Ponds	01-Aug-08	CE	11:18		foot							0	
38	Beaver Ponds	23-Aug-08	CE, KO	13:15	13:35	foot	23		Calm	None	>50	CHPI	1	Yes
38	Beaver Ponds	12-Sep-08	CE, KO	13:00	13:10	foot	20		Light	None	0	TRSC	1	Yes
39	Beckwith Park	21-Jul-08	KP, CE, KO	15:45	16:15	foot	22	23	Light	None	0	Unknown	9+	No
39	Beckwith Park	06-Aug-08	CE, KO	14:08	15:15	foot	27		Light	None	<50	TRSC	6	No
40	Blenkinshop Lake	06-Aug-08	CE, KO	15:40	16:03	foot	27		Light	None	<50		0	No
49	Crabapple Lake	08-Aug-08	CE, KO	12:30	13:48	foot	22	22	Moderate	None	0		0	No
20	Durrance Lake	07-Jun-08	CE	15:00	16:00	foot						TRSC	3	
20	Durrance Lake	16-Jun-08	CE	6:49	7:35	foot					<50		0	
20	Durrance Lake	16-Jun-08	CE, KO	11:45	12:20	foot						TRSC	6	
20	Durrance Lake	21-Jun-08	CE	6:43	7:32	foot							0	
20	Durrance Lake	28-Jun-08	CE	22:00		foot						TRSC	1	
20	Durrance Lake	29-Jun-08	CE	22:00	22:30	foot	23		Calm		0		0	
20	Durrance Lake	13 Jul-08	KP, John G.	18:15	19:00	boat	20		Light	None	0		0	
20	Durrance Lake	19-Aug-08	CE	14:37	14:55	foot	17	23	Light	None	100		0	
20	Durrance Lake	12-Sep-08	CE, KO	11:00	11:15	foot	20		Moderate	None	0	TRSC	1	
22	Eagle Lake	24-Jul-08	TC, CE			foot			Light	None	<5		0	
41	Elk Lake	07-Jun-08	CE	6:00	6:55	foot	9	17	Calm	None	<50		0	
41	Elk Lake	26-Jun-08	CE	7:00	7:45	foot							0	
41	Elk Lake	22-Jul-08	CE, KO	14:55	17:00	boat	20	24	Moderate	None	0	TRSC	1	
41	Elk Lake	22-Jul-08	CE, KO	14:55	17:00	boat	20	24	Moderate	None	0	Unknown	2	
41	Elk Lake	22-Jul-08	CE, KO	14:55	17:00	boat	20	24	Moderate	None	0	TRSC	2	
41	Elk Lake	22-Jul-08	CE, KO	14:55	17:00	boat	20	24	Moderate	None	0	TRSC	1	
41	Elk Lake	22-Jul-08	CE, KO	14:55	17:00	boat	20	24	Moderate	None	0	CHPI	1	
23	First Lake	25-Jul-08	TC, KO	12:17	12:48	boat	20	19	Light	None	>50		0	Yes

Site ID	Location	Date	Observers	Start time	End time	Survey method	Air temp (C)	Water temp (C)	Wind speed	Precip.	Cloud cover (%)	Species (turtle)	# of turtles seen	Bullfrogs (Seen; Heard)
31	Florence Lake	11-Sep-08	CE, KO	13:56	14:45	foot	21	23	Light	None	0	TRSC	1	Yes
42	Fork Lake	3-Jul-08	CE	14:47	15:15	foot	21		Calm	None	<5		0	
42	Fork Lake	24-Jul-08	TC, CE			boat	22	24	Light	None	<5		0	yes
32	Glen Lake	27-Jun-08	TC, CE	12:30	13:18	boat							0	
50	Grass Lake	09-Jul-08	CE, KO	13:17	14:21	foot	22	26	Light	None	0		0	
36	Hagan Creek Pond 1	12-Sep-08	CE, KO	12:00	12:20	foot	20		Light	None	0	Unknown	1	
21	Hovey Rd Pond	07-Aug-08	TC, CE	13:00		foot			Calm	None	<50	TRSC	1	Yes
53	Hydro Pond, Munn's Rd	23-Aug-08	CE, KO	16:45	16:55	foot	23		Light	None	>50		0	
33	Kettle Pond (just north of Langford Lake)	30-Jun-08	CE, KO	13:20	13:35	foot	30		Calm	None	>50		0	No
43	Killarney Lake	01-Jul-08	KO, CE	15:00	15:45	foot	25	24	Calm	None	0		0	
43	Killarney Lake	20-Jul-08	KO, Ira Willey	15:00	15:30	foot	22				0		0	
34	Langford Lake	27-Jun-08	TC, CE	13:40	14:06	boat						CHPI	6	
34	Langford Lake	30-Jun-08	CE, KO	14:00	15:40	boat	32	24	Calm	None	<50	CHPI	6	
34	Langford Lake	30-Jun-08	CE, KO	14:00	15:40	boat	32	24	Calm	None	<50	Unknown	3	No
34	Langford Lake	30-Jun-08	CE, KO	14:00	15:40	boat	32	24	Calm	None	<50	CHPI	2	
34	Langford Lake	11-Sep-08	CE, KO	15:00	15:17	foot	22		Light	None	0		0	Yes
44	Maltby Lake	25-Jul-08	TC, KO	14:05	14:45	boat	26	22	Light	None	<50		0	Yes
35	Matheson Lake	27-Jun-08	TC, CE	10:50	12:17	boat						TRSC	1	
35	Matheson Lake	23-Jul-08	CE, KO	10:36	15:00	boat	19	19	Moderate	None	>50	TRSC	1	
35	Matheson Lake	23-Jul-08	CE, KO	10:36	15:00	boat	19	19	Moderate	None	>50	CHPI	1	
24	Matson Lake	24-Jul-08	TC, CE			foot			Light	None	<5	TRSC	1	?
54	McKenzie Lake	07-Jul-08	CE, KO	14:25	14:51	foot	22		Calm	None	0		0	No
25	Munn's Road Pond 1	07-Aug-08	TC, CE	11:00		foot			Calm	None	<50		0	Yes
NA	Oldfield Road	16-Aug-08	CE			car						CHPI	1	
26	Pease Lake	16-Jun-08	CE, KO	12:25	12:35	foot							0	
26	Pease Lake	15-Jul-08	KO, CE, Ira Willey	12:00	12:30	boat	24	23	Light	None	0		0	
51	Pond btw Shields & Grass Lake	09-Jul-08	CE, KO	12:55	13:07	foot	22		Light	None	0		0	
45	Pond by Maltby Lake	25-Jul-08	TC, KO	15:05	15:15	foot	20		Light	None	>50		0	
55	Prior Lake	07-Jul-08	CE, KO	13:25	13:38	foot	25		Calm	None	0		0	No

Site ID	Location	Date	Observers	Start time	End time	Survey method	Air temp (C)	Water temp (C)	Wind speed	Precip.	Cloud cover (%)	Species (turtle)	# of turtles seen	Bullfrogs (Seen; Heard)
55	Prior Lake	15-Jul-08	KO, CE, Ira Willey	11:15	11:30	foot	18	22	Calm	None	0		0	No
46	Prospect Lake	17-Jun-08	CE	13:00	13:20	foot					>50		0	
46	Prospect Lake	18-Jul-08	CE, KO	12:00	13:30	boat	20	23	Light	None	<50	TRSC	1	Yes
46	Prospect Lake	06-Aug-08	CE, KO	13:08	13:34	boat	25	22	Light	None	>50	TRSC	1	No
47	Prospect Lake Rd Pond 1	07-Aug-08	TC, CE	10:15		foot			Calm	None	<50	TRSC	1	Yes
27	Second Lake	23-Aug-08	CE, KO	15:00	15:30	boat	23	22	Light	None	>50			
28	Second Lake, backwaters	25-Jul-08	TC, KO	10:40	11:40	boat	22	19	Light	None	>50		0	
28	Second Lake, backwaters	23-Aug-08	CE, KO	16:00	16:30	boat			Light	None	>50			Yes
52	Shields Lake	09-Jul-08	CE, KO	11:30	12:54	foot	21	22	Light	None	0		0	No
52	Shields Lake	08-Aug-08	CE, KO	14:48	15:12	foot	19	22	Moderate	None	<50		0	No
48	Swan Lake	09-Sep-08	CE	15:15	15:52	foot	20	21	Light	None	0	CHPI	2	Yes
48	Swan Lake	09-Sep-08	CE	15:15	15:52	foot	20	21	Light	None	0	Unknown	6	Yes
29	Teanoak Lake	24-Jul-08	TC, CE			boat			Light	None	<5		0	
56	Thetis Lake (Lower)	08-Jun-08	CE, KO	16:00	16:14	foot	26	24	Calm	None	0		0	
56	Thetis Lake (Lower)	11-Sep-08	CE, KO	15:00	15:15	foot	20		Light	None	0		0	
56	Thetis Lake (Upper)	08-Jun-08	CE	13:36	16:00	foot	26	24	Calm	None	0	TRSC	7	
56	Thetis Lake (Upper)	08-Jun-08	CE	13:36	16:00	foot	26	24	Calm	None	0	Unknown	1	
56	Thetis Lake (Upper)	11-Sep-08	CE, KO	15:40	16:15	foot	20		Light	None	0	TRSC	4	
30	Third Lake	24-Jul-08	TC, CE			boat	19	25	Light	None	<5		0	
<u>Vancouver Island, Nanaimo:</u>														
57	Buttertubs Marsh	28-Jul-08	KO, CE, KP & BCCA crew	10:30	11:35	foot	17	20	Light	None	<50	TRSC	7	Yes
57	Buttertubs Marsh	28-Jul-08	KO, CE, KP & BCCA crew	10:30	11:35	foot	17	20	Light	None	<50	CHPI	3	Yes
58	Morrell Lake, Westwood Lake Park	28-Jul-08	CE, N. Jachett	13:10	14:05	foot	22	22	Light	None	>50		0	Yes
59	Westwood Lake	28-Jul-08	KP, M. Dil, V. Young	12:50	14:05	boat	17	22	Moderate	None	100	TRSC	1	
59	Westwood Lake	28-Jul-08	KO, Jeannine Randall	12:51	14:31	boat	20	21	Moderate	None	>50	Unknown	1	No
<u>Vancouver Island, Alberni Valley:</u>														

Site ID	Location	Date	Observers	Start time	End time	Survey method	Air temp (C)	Water temp (C)	Wind speed	Precip.	Cloud cover (%)	Species (turtle)	# of turtles seen	Bullfrogs (Seen; Heard)
60	Airport wetlands	12-Aug-08	KO, CE, Rick & Libby Avis	14:00	15:00	foot	22		Calm	Drizzle	100	CHPI	1	
60	Airport wetlands	13-Aug-08	CE, KO	10:35	10:55	foot	20	22	Calm	None	<50	CHPI	3	No
61	Ash Main, at 6 km	13-Aug-08	CE, KO	14:00	14:15	foot	25		Calm	None	<50		0	No
62	Canal Main, 2 km	13-Aug-08	CE, KO	14:15	14:30	foot	26	24	Light	None	<50		0	No
63	Devil's Den Lake	13-Aug-08	CE, KO	14:45	15:30	foot	26		Light	None	<50		0	Yes
73	Great Central Lake	4 Aug-08	KP, John G.	11:10	12:30	boat	24						0	
64	Little Turtle Lake	12-Aug-08	KO, CE, Rick & Libby Avis	13:40	13:55	foot	20		Calm	None	100	Unknown	1	No
64	Little Turtle Lake	13-Aug-08	CE, KO	11:12	12:06	boat	22	22	Calm	None	<50	CHPI	2	No
65	Loon Lake	13-Aug-08	CE, KO	16:45	17:30	boat	24		Light	None	<50	TRSC	3	No
72	Lowry Lake	8 Aug-08	KP, John G.	13:30	15:30	boat	25	22	Light	None	0		0	
66	Moran Lake	12-Aug-08	KO, CE, Rick & Libby Avis	15:40	16:00	foot	22		Calm	None	100		0	No
67	Patterson Lake	12-Aug-08	KO, CE, Rick & Libby Avis	16:30	17:18	foot	20	20	Calm	None	100	CHPI	1	No
68	Sumner Lake	12-Aug-08	KO, CE, Rick & Libby Avis	16:10	16:23	foot	19		Moderate	None	100		0	No
68	Sumner Lake	5 Aug-08	KP, John G.	13:30	15:00	boat	27	27	Calm	None	0	Unknown	1	
69	Turtle Lake	12-Aug-08	KO, CE, Rick & Libby Avis	15:10	15:20	foot	22		Calm	None	100		0	No
69	Turtle Lake	4 Aug-08	KP	17:00	17:30	boat	30		Calm	None	0		0	
70	Tyler Rd Pond	13-Aug-08	CE, KO	13:20	13:42	foot	20		Light	None	<50		0	Yes
71	Wetland west of Turtle Lake	12-Aug-08	KO, CE, Rick & Libby Avis	15:00	15:10	foot	22		Calm	None	100		0	
<u>Vancouver Island, Port Renfrew:</u>														
74	Dimple Lake	20 Jul-08	KP, John G.	14:15	15:20	boat	20		Moderate	None	<50		0	
75	Pixie Lake	25 May-08	KP, John G.	15:30	16:40	boat	15		Light	None	<50		0	
<u>Vancouver Island, Cowichan Valley:</u>														
76	Kissinger Lake	19 May-08	KP, John G.	14:20	15:40	boat	15		Moderate	None			0	

Appendix 3: Summary of threat assessment for the Western Painted Turtle at sites surveyed in 2008.

ID #	Location	Roads - paved	Roads - unpaved	Recreation (motorized)	Recreation (non-motorized)	Pets	Exotic species	Residential	Forestry	Other	Comments about threats
<u>Vancouver Island, CRD (Central Saanich):</u>											
20	Durrance Lake	L			H	L	H				Heavily used recreation site for swimming, boating and fishing
<u>Vancouver Island, CRD (Langford):</u>											
34	Langford Lake	L		L-M		L-M	M?	H		Mechanical aquatic weed removal; retaining walls along shoreline on many properties preventing access to land	Residential development ongoing in the area; turtles caught during aquatic weed clearing in harvester at rates of up to 6 per hour & released apparently unharmed (operator report)
<u>Vancouver Island, CRD (Metchosin):</u>											
35	Matheson Lake				M-H						Nesting ground on island heavily used recreational day use area; boat access only
<u>Vancouver Island, CRD (Saanich):</u>											
37	Beaver Lake	L	L		H	H	H	L			Heavily used recreation site for swimming, boating, fishing, & dog walking; bullfrogs and sliders present
38	Beaver Ponds (East Pond)	L	L		H	H	H				Used for retriever (dog) training and dog walking; potential to disturb nesting turtles high; road kill hatchling turtle observed
38	Beaver Ponds (West Pond)	L	M		M	M	H				
39	Beckwith Park	L	N		H	H	?	H		Many ducks in pond & on logs	Recent excavation and piles of dirt near pond; wading pool, soccer field & grass field; parking lots
41	Elk Lake	L	L	H	H	H	H	L			Lake heavily used for recreation, including motor boats; Pat Bay HWY on one side
44	Maltby Lake		L		L		?	L			Bullfrogs & pumpkin fish present
45	Pond by Maltby Lake										Close to busy road

ID #	Location	Roads - paved	Roads - unpaved	Recreation (motorized)	Recreation (non-motorized)	Pets	Exotic species	Residential	Forestry	Other	Comments about threats
48	Swan Lake				M	L	H				Saw several bullfrogs; attempts to control them
<u>Vancouver Island, CRD (View Royal):</u>											
54	McKenzie Lake	L	L	L	H	?	?	L			
<u>Vancouver Island, Nanaimo:</u>											
57	Buttertubs Marsh	L	L		L	L	M	M			Pond & wetland surrounded by roads and residential development
<u>Vancouver Island, Port Alberni:</u>											
60	Airport wetlands		M	H	H				L	Predation: disturbed nests & eggs seen at N1 nesting area	Evidence of shooting practice in gravel pit with nests; vehicular traffic & ATVs a threat to nesting grounds & migrating turtles
64	Little Turtle Lake		L		L				L		Beaver control in area; duck hunting & fishing
67	Patterson Lake		L		L				L	Beaver trapping is altering water levels & natural succession	