

# Western Painted Turtle Surveys and Stewardship Activities on Vancouver Island in 2011



Photo @ K. Ovaska

**Prepared for**

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## **Acknowledgments**

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In Elk/Beaver Lake Regional Park, nesting habitat enhancement projects received support from CRD Regional Parks, Elk-Beaver Lake Equestrian Society, Vancouver Island Retriever Club, and volunteers from Starbucks and CRD Parks. Colleen Lang (CRD Parks volunteer coordinator) and Wendy Weldring (Starbucks Store Manager) both did a fabulous job organizing volunteers. We much appreciate help from Karen Preston in monitoring turtle nesting activity. C. Rombough kindly helped in identification of introduced turtles.

In Alberni Valley, Rick and Libby Avis, Alberni Valley Enhancement Society, continued to share their local knowledge of turtles and their habitats, accompanied us in the field, and provided invaluable logistical assistance, including sharing their home with us. Island Timberlands graciously allowed us access to their private forestry lands and provided invaluable assistance with a habitat enhancement project and threat mitigation activities; their support included materials, heavy machinery, and personnel for the habitat enhancement project.

We thank all the landowners who allowed us access to their properties, and the numerous volunteers, including students from Camosun College Environmental Technology Program, who helped with the project.

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## Executive Summary

Western Painted Turtles (*Chrysemys picta bellii*) on the Pacific coast are endangered in Canada (COSEWIC 2006) and on the provincial Red List of species at risk in British Columbia. The turtles occur within populated and highly modified landscapes in the southwestern part of the province, where they face a multitude of threats ranging from wetland loss and degradation to road kill. Conservation efforts are hindered by incomplete knowledge of the species' distribution, habitat use, and nesting ecology, which is needed for directing stewardship efforts.

This study is part of Habitat Acquisition Trust's (HAT) Stewardship Program for species at risk. The Western Painted Turtle was added as a focal species in 2008 with annual surveys, stewardship, and outreach activities focusing on the Capital Regional District (CRD). In addition, work has been initiated in Alberni Valley, where the turtles occur mainly within private forestry lands. Here we report on surveys and stewardship activities carried out in 2011. The objectives were to (1) conduct surveys for the Western Painted Turtle to clarify its distribution and to assess threats in focal areas within CRD and Alberni Valley; (2) monitor known nesting areas and engage in nesting habitat enhancement/ restoration with collaboration from landowners; (3) monitor effectiveness of previously installed basking logs in enhancing turtle habitat; (4) obtain information on movements and important seasonal habitats through telemetry, and on population size, trends, and demography through mark-recapture; (5) develop management guidelines for landowners and managers; and (6) conduct outreach to the public and involve private landowners and land managers in stewardship activities.

### Distribution and Threats:

Information on distribution is essential to direct habitat protection and stewardship efforts. During the 2011 field season, we surveyed 16 water bodies for turtles in Alberni Valley and within CRD on southern Vancouver Island. We encountered the Western Painted Turtle at five sites, one of which, McKenzie Slough in Alberni Valley, represents a new locality record for the species. From 2008 – 2011, we have conducted 232 surveys of 96 water bodies for turtles and have found the Western Painted Turtle at 15 sites; a small number of additional records exist based on road kills and reliable landowner reports. In Alberni Valley, turtles occur within forestry lands, and logging roads pose a potential threat to turtles through road kill. In CRD, turtles inhabit water bodies amidst residential areas, including CRD Regional Parks and other protected areas. Threats to turtles accrue from various sources, including habitat alteration from housing developments and landscaping activities outside parks, road kill, disturbance from recreational activities, roaming pets, and potentially from introduced turtles and bullfrogs.

### Nesting Ground Monitoring and Enhancement:

At Elk/Beaver Lake Regional Park, we monitored nesting ecology of the Western Painted Turtle through the 2011 field season and continued experimental nesting habitat enhancement activities, begun in 2010. From 5 April – 17 June 2011, we found a total of 18 emerged nests at Elk/Beaver Lake Regional Park, 15 of which were within a

previously identified communal nesting area (referred to as East Pond site). Hatchlings began emerging later in 2011 than in previous years, probably due to cool and wet conditions in spring, and unlike in previous years, hatching continued well into June. From 6 June – 16 July 2011, we found a total of 16 new Western Painted Turtle nests, 11 of which were at the East Pond site. Western Painted Turtles began egg-laying somewhat later than in previous years. No nesting was documented in May, in contrast to 2009 and 2010. At the East Pond site, nest success, as indicated by the proportion of emerged nests, has been relatively high, 50%– 77.8%, since monitoring began in 2008; it was 63.2% for nests laid in summer 2010 and emerged in spring 2011.

Together with volunteers and land owners/managers, we carried out nesting habitat enhancement projects in 2011 in Elk/Beaver Lake Regional Park in CRD and in Alberni Valley at sites that were previously deemed to benefit from enhancement. In Elk/Beaver Lake Regional Park, we engaged in nesting habitat enhancement at two sites in collaboration with CRD Parks, Elk-Beaver Lake Equestrian Society, and volunteers from Starbucks and CRD Parks. In Alberni Valley, we enhanced a nesting site where turtles had been observed nesting in previous years, in collaboration with Island Timberlands and volunteers from Alberni Valley Enhancement Society. A pictorial summary of each project was prepared and distributed to the collaborators and participants.

In Elk/Beaver Lake Regional Park, disturbance to emerging and nesting turtles and encroachment of grass and weeds were identified as the main problems for turtles nesting in the Beaver Lake area. In spring 2010, we began an experiment to investigate the effectiveness of tilling small (1 m<sup>2</sup>) plots as a method for nesting habitat enhancement. In both 2010 and 2011, female Western Painted Turtles preferentially constructed nests in newly tilled plots over plots from where hatchlings had emerged in the previous year or unmanipulated control plots (2010 experiment) and over plots tilled 1 year previously or from where hatchlings had emerged 2 years previously (2011 experiment). The newly tilled plots also resulted in more emerged nests in spring 2011 than did the other plots. These experiments show that turtles preferentially use newly tilled plots and that tilling of even small plots is an effective habitat restoration measure at sites where vegetation in-growth is a problem. However, continuous maintenance is required, as plots tilled the year before ceased to be effective and were rapidly invaded by weeds. Packing the soil firmly in tilled plots may be effective against weed establishment and for encouraging nesting turtles that appear to prefer compact nesting substrates.

At Swan Lake and Christmas Hill Nature Sanctuary, we restored a turtle nesting area in 2010 that had overgrown with weeds (Engelstoff and Ovaska 2011). Turtles began using the site almost immediately, but none of the 3 turtle nests, which included a Slider nest, emerged in spring 2011 for unknown reasons. Volunteers and visitors recorded 4 new turtle nests at the restored site in June 2011 and an additional nesting attempt in early July, documenting that turtles are using the site. We plan to monitor nesting success in spring 2012.

### Enhancement of Aquatic Habitat:

In 2010, we installed basking logs, consisting mostly of mill-end slabs, in four water bodies within CRD to enhance the aquatic habitat for turtles. The basking logs appeared to be an instant success with turtles using them within an hour of installation and continuing to use them throughout the summer in 2010. However, while some logs continued to be functional in 2011, many had sunk either due to shoreline or aquatic vegetation in-growth or to water-logging. This finding emphasizes the importance of monitoring the effectiveness of habitat enhancement projects beyond the first year. Work to redesign basking logs and their anchoring method suited to sites with rapid shoreline vegetation growth is planned for 2012.

### Mark-recapture and Telemetry:

In 2011, we continued a mark-recapture study started in 2010 at Swan Lake in Swan Lake and Christmas Hill Nature Sanctuary and initiated similar studies at two additional sites, Beaver Lake in Elk/Beaver Lake Park within CRD and “Airport Wetlands” in Alberni Valley. We used hoop traps to capture turtles for a total of 39 trap-days and 124 trap checks, supplemented by capture with dip-nets or by hand. In total, we caught 40 Western Painted Turtles, 5 introduced Sliders, and a Reeve’s Pond Turtle, also introduced. Capture success was greatly reduced at Swan Lake from the previous year (18 Western Painted Turtles caught in 2010 versus 6 in 2011, although capture effort was greater in 2011, and only 3 turtles marked the previous year were recaptured. Mark-recapture studies at all three sites form baseline data for comparisons as more data accumulate.

In 2011, we continued to track movements of adult Western Painted Turtles outfitted with radio-transmitters in 2010 in Swan Lake. The tagged turtles used the same over-wintering sites in the southeast end of the lake in 2011 as in 2010. During the rest of the year, they were widespread along much of the shoreline of the lake, and none were observed leaving the area.

### Management Guidelines:

Management guidelines were developed with the objective of providing land managers with tools to mitigate threats to turtle populations and habitats on their lands using best available information. In 2011, we developed guidelines for managing turtle populations in urban and rural areas; these guidelines complement best management practices developed in 2010 for turtles on forestry lands. Both sets of guidelines are available through HAT’s Species at Risk web site ([www.speciesatrisk.hat.bc.ca](http://www.speciesatrisk.hat.bc.ca)). Personalized, site-specific habitat management guidelines were prepared for one large landowner in CRD.

### Outreach and Stewardship:

In 2011, HAT continued an ongoing outreach campaign to create local awareness of species at risk, to solicit reports from the public, and to help landowners manage for species at risk and their habitats. Activities included visits by Land Trust staff to 15 properties with habitat suitable for Western Painted Turtles and 15 public outreach

events highlighting turtle conservation. Staff confirmed 3 new occurrences of the species in Metchosin.

In addition to outreach, we collaborated with large landowners and local volunteers at 3 sites on improving nesting habitat and implementing threat mitigation. In Alberni Valley, Island Timberlands assisted us in nesting habitat enhancement, installed turtle crossing signage on logging roads, and erected barriers and deactivated a spur road to prevent vehicle access to sites used by nesting turtles. In Elk/Beaver Lake Regional Park, CRD Parks assisted us with nesting habitat enhancement and installed fencing around nesting areas to curtail disturbance. At Swan Lake, Swan Lake and Christmas Hill Nature Sanctuary staff monitored nesting turtles and helped with telemetry.

### Recommendations for 2012:

The following priorities for work in 2012 were identified:

- Extend the survey coverage to new areas on Vancouver Island, as well as filling in data gaps within areas already surveyed. It is essential to know where the Western Painted Turtle occurs to adequately manage populations and habitats.
- Continue mark-recapture and telemetry studies and monitoring of nesting ecology of turtles. Multi-year studies are required for the above activities to obtain an accurate picture of habitat use, demography, movements, and timing of important life history events, such as egg-laying and hatchling emergence, in relation to environmental conditions.
- Continue habitat enhancement projects, including nesting habitat enhancement and basking site installation at sites that are deemed to benefit from these activities.
- Continue outreach and stewardship activities. These activities are essential for the conservation of the Western Painted Turtle, as most of the species' range along the Pacific coast is on private lands. We plan to continue developing management guidelines and assisting landowners with their implementation, including mitigating threats, enhancement of nesting and aquatic habitat, and monitoring effectiveness of these actions.

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## **Introduction**

The endangered Pacific Coast Population of the Western Painted Turtle (*Chrysemys picta belli*) occurs in southwestern British Columbia, where its habitats have been heavily modified by residential and agricultural developments, road building, and forestry. 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 2011 field season. This study is part of Habitat Acquisition Trust's Species At Risk Program and represents continuation of efforts begun in 2008, filling in data gaps and building on previous years' activities (Engelstoft and Ovaska 2008, 2011; Ovaska and Engelstoft 2009, 2010). This study was conducted in collaboration with Capital Regional District (CRD) Regional Parks, Swan Lake and Christmas Hill Nature Sanctuary, Island Timberlands, and other private landowners/managers.

For ease of reading, the report is organized into six stand-alone chapters that deal with different aspects of the study: 1. Distribution and threats; 2. Nesting ground monitoring and enhancement; 3. Enhancement of aquatic habitat; 4. Mark-recapture and telemetry; 5. Management Guidelines; 6. Outreach and Stewardship. All contribute towards the common goal of conserving Western Painted Turtle populations and their habitats on Vancouver Island and the Gulf Islands.

## **Goal and Objectives**

The goal of the project is to contribute information on the distribution, habitat use, and threats for the Western Painted Turtle (Pacific Coast Population), so that populations and habitats can be protected through stewardship and other recovery activities.

The objectives for 2011 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 Alberni Valley.
2. Enhance Nesting Habitat: Monitor known nesting areas and engage in nesting habitat enhancement/ restoration with collaboration from landowners.
3. Enhance Aquatic Habitat: Monitor effectiveness of previously installed basking logs.
4. Obtain information on movements and important seasonal habitats through telemetry and on population size, trends, and demography through mark-recapture studies.
5. Develop management guidelines for landowners and managers.
6. Conduct outreach to the public and involve private landowners and land managers in stewardship activities

# Chapter 1: Distribution and Threat Assessment

## ***Corresponding Objective:***

Objective 1: Conduct surveys for the Western Painted Turtle to clarify its distribution and to assess threats in focal areas within CRD and Alberni Valley.

## ***Rationale***

The distribution of the Western Painted Turtle on Vancouver Island is incompletely known, hindering conservation efforts. The focus of the surveys in 2011 was to fill in data gaps identified in previous years and to assess threats at occupied sites. Adequate knowledge of the distribution of a species is an essential first step towards conservation.

## ***Approach & Methods***

We selected water bodies for surveys based on gaps in survey coverage in the focal areas and followed tips of turtle sightings from naturalists, residents, and the public. In 2011, a new focus area within CRD was the Greater Victoria Watershed, which contains numerous lakes and wetlands. The survey protocol was as in previous years (Engelstoff and Ovaska 2011): One or more observers visually searched for basking or swimming turtles either from a canoe 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.

Following methods from previous years, we conducted a habitat assessment during the first visit to each site (Engelstoff 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.

## ***Results & Discussion***

### **Distribution**

From May to September 2011, we surveyed 16 water bodies for turtles one or more times (Table 1). Twelve sites were surveyed for the first time in 2011, while the remaining surveys represented revisits to sites visited in 2008 – 2010. There were additional visits, not included in Table 1, to two sites (Elk/Beaver Lake; Swan Lake) as part of mark-recapture, telemetry, and/or nest site monitoring (see corresponding chapters in this report).

**Table 1. Summary of water bodies searched for turtles on Vancouver Island in 2011.**

| Area                    | # sites surveyed | # surveys | Survey time (person-hour) |
|-------------------------|------------------|-----------|---------------------------|
| Alberni Valley          | 3                | 6         | 9.4                       |
| Capital Region District | 13               | 19        | 23.3                      |
| TOTAL                   | 16               | 25        | 32.7                      |

During the 2011 surveys, we found the Western Painted Turtle at five water bodies (Table 2). Observations at McKenzie Slough in Alberni Valley represent a new distribution record for the species, while the remaining observations are from previously known sites. Our attention was initially drawn to this site by a report from a resident to our local contacts, Rick and Libby Avis, who informed us of the sighting and accompanied us there in May 2011. Four adult Western Painted Turtles were sighted during this visit.

Also in Alberni Valley, at a shallow wetland colloquially known as Airport Wetlands, we observed relatively large numbers of Western Painted Turtles during visits in spring and autumn (Table 2). The turtles were of different size classes ranging from large adults to small juveniles, indicating successful reproduction. This population is the largest we have encountered on Vancouver Island, based on the number of turtles counted. Two other large populations are found in Elk/Beaver Lake and Langford Lake in CRD. A mark-recapture study at the Airport Wetlands site was initiated to obtain information on the population size and trends.

Within CRD, Western Painted Turtles continue to persist in very small numbers in Glen Lake and Florence Lake amidst residential areas. Only 1 – 3 adult Western Painted Turtles have ever been found at any one time at these sites, and whether they represent viable populations or non-reproducing releases is unknown. We failed to find any turtles in water bodies within the Greater Victoria Watershed. There are anecdotal records of turtles (species unknown) from the Sooke Reservoir, before it was expanded and upgraded in 2002, and from Humpback Reservoir. According to Greater Victoria Watershed personnel, a turtle found in the Humpback Reservoir was captured and moved to Florence Lake several years ago.

**Table 2. Conditions and results of surveys conducted from May to September 2011.**

| Site name              | Date      | Start time | Search time (pers. min) | Air temp °C | Water temp C° | Cloud cover (%) | Survey method | Western Painted Turtle (#) | Red-eared Slider (#) |
|------------------------|-----------|------------|-------------------------|-------------|---------------|-----------------|---------------|----------------------------|----------------------|
| <b>Alberni Valley:</b> |           |            |                         |             |               |                 |               |                            |                      |
| Airport Wetlands       | 27-May-11 | 15:10      | 40                      | 17          | 22            | >50             | Boat, foot    | 23                         | 0                    |
| Airport Wetlands       | 28-May-11 | 11:30      | 120                     | 15          | 18            | >50             | Boat, foot    | 33                         | 0                    |
| Airport Wetlands       | 20-Sep-11 | 11:00      | 195                     | 12          | 16            | >50             | Boat          | 56                         | 1                    |

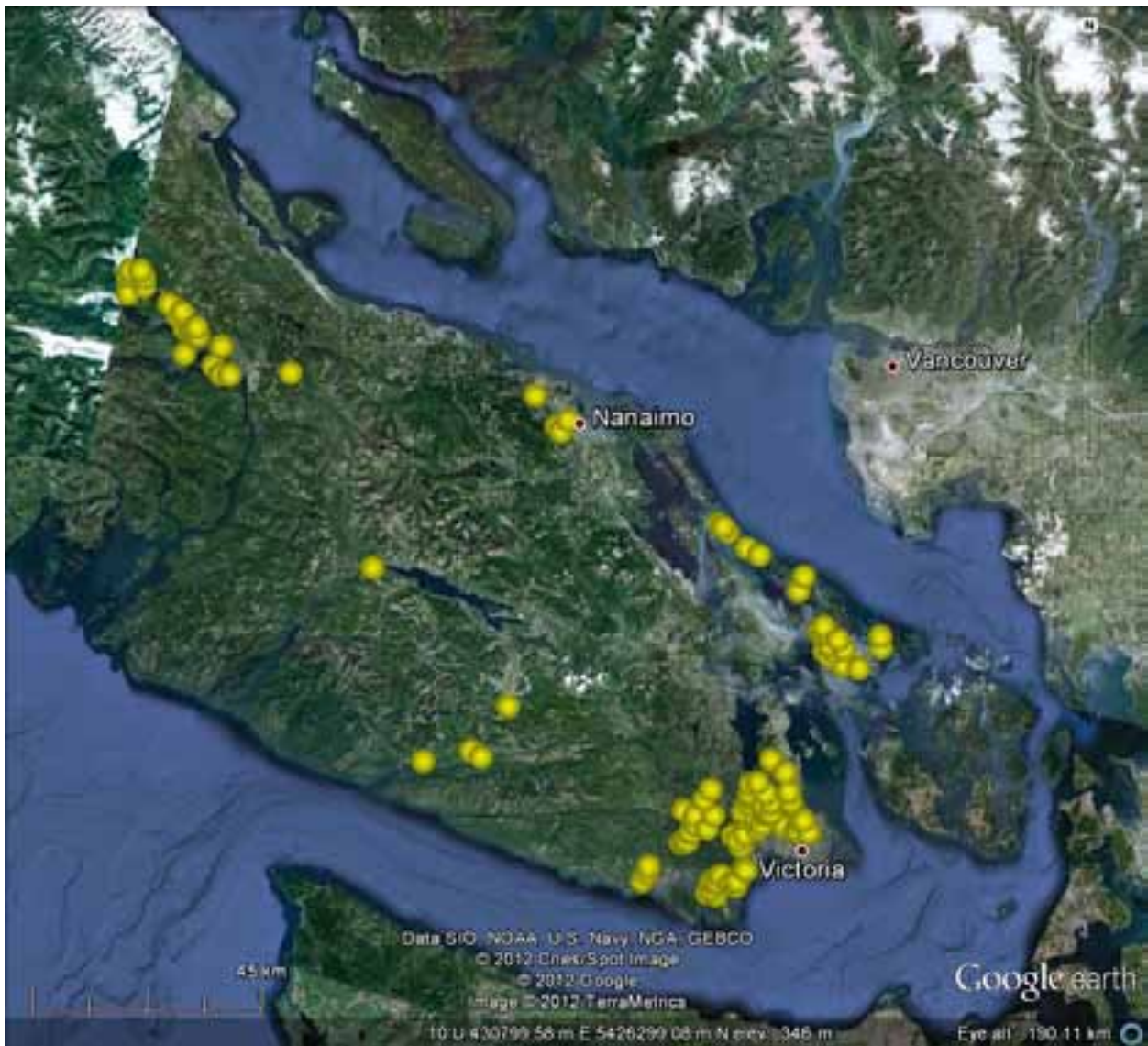
| Site name                         | Date      | Start time | Search time (pers. min) | Air temp °C | Water temp C° | Cloud cover (%) | Survey method | Western Painted Turtle (#) | Red-eared Slider (#) |
|-----------------------------------|-----------|------------|-------------------------|-------------|---------------|-----------------|---------------|----------------------------|----------------------|
| Airport Wetlands                  | 21-Sep-11 | 10:50      | 50                      | 16          | 16            | 100             | Boat          | 0                          | 0                    |
| McKenzie Slough, Stamp River      | 28-May-11 | 14:55      | 100                     | 19          | 18            | 100             | Foot          | 4                          | 0                    |
| Winer Wetland, by Sproat Lake     | 21-Sep-11 | 9:15       | 60                      | 17          |               | 100             | Foot          | 0                          | 0                    |
| <b>Capital Regional District:</b> |           |            |                         |             |               |                 |               |                            |                      |
| Arc Lake                          | 11-Jul-11 | 12:30      | 60                      | 20          | 19.5          | 100             | Boat          | 0                          | 0                    |
| Cabin Pond Reservoir              | 21-Jun-11 | 11:00      | 30                      | 21          |               | <50             | Foot          | 0                          | 0                    |
| Florence Lake                     | 25-May-11 | 9:25       | 80                      | 19          | 16            | <50             | Foot          | 2                          | 3                    |
| Florence Lake                     | 8-Sep-11  | 10:45      | 120                     |             |               | 0               | Boat          | 0                          | 1                    |
| Frog Lake                         | 11-Jul-11 | 11:30      | 50                      | 18          | 19.5          | 100             | Boat          | 0                          | 0                    |
| Glen Lake                         | 25-May-11 | 10:35      | 60                      | 18          | 16            | <50             | Foot          | 1                          | 5                    |
| Gleren Lake                       | 11-Jul-11 | 10:40      | 50                      | 20          | 19            | >50             | Boat          | 0                          | 0                    |
| Jack Lake                         | 21-Jun-11 | 11:30      | 60                      | 23          |               | >50             | Foot          | 0                          | 0                    |
| Jack Lake                         | 11-Jul-11 | 14:30      | 70                      | 20          | 21            | 100             | Boat          | 0                          | 0                    |
| Langford Lake                     | 8-Sep-11  | 12:15      | 170                     |             |               | 0               | Boat          | 12                         | 1                    |
| Lubbe Lake                        | 11-Jul-11 | 13:40      | 30                      | 21          | 19            | >50             | Foot          | 0                          | 0                    |
| Matheson Lake                     | 21 Aug-11 | 11:00      | 280                     | 18          |               | <5              | Boat          | 3                          | 1                    |
| Mavis Lake                        | 21-Jun-11 | 13:15      | 90                      | 20          | 18            | >50             | Boat          | 0                          | 0                    |
| Mavis Lake                        | 11-Jul-11 | 14:10      | 20                      | 20          |               | 100             | Foot          | 0                          | 0                    |
| Old Wolf Lake                     | 21-Jun-11 | 14:50      | 20                      | 23          | 21            | >50             | Foot          | 0                          | 0                    |
| Pease Lake                        | 9-Sep-11  | 15:15      | 20                      |             |               | 0               | Swim          | 0                          | 1                    |
| Pond, N of Langford Lake          | 25-May-11 | 8:45       | 20                      |             |               | 0               | Foot          | 0                          | 0                    |
| Pond, N of Langford Lake          | 21-Jun-11 | 15:45      | 20                      | 23          |               | >50             | Foot          | 0                          | 0                    |
| Swan Lake                         | 31-Aug-11 | 14:45      | 120                     | 21          | 24            | 10              | Boat          | 8                          | 1                    |

We found the introduced Red-eared Slider at 5 of the sites surveyed in 2011 (Table 2). This species is widely distributed within CRD but appears to be uncommon in the Alberni Valley (Engelstoff and Ovaska 2011). At Airport Wetlands, one adult Slider was encountered in May of both 2010 and 2011.

From 2008 - 2011, we have conducted 232 surveys for turtles at a total of 96 water bodies on Vancouver Island and southern Gulf Islands (Figure 1; Appendix 1; note that some sites have nearby sub-sites connected at high water and were counted as one site). We have found the Western Painted Turtle at 15 sites (Figures 2 & 3; Appendix 1). This species' presence has been confirmed at a small number of additional sites in CRD based on reliable records from the public or residents or from road kills (Figure 2). Our survey efforts have mainly focused on CRD and Alberni Valley. Significant data gaps in survey coverage remain along the east coast of Vancouver Island, from where there are unconfirmed or isolated records of turtles.

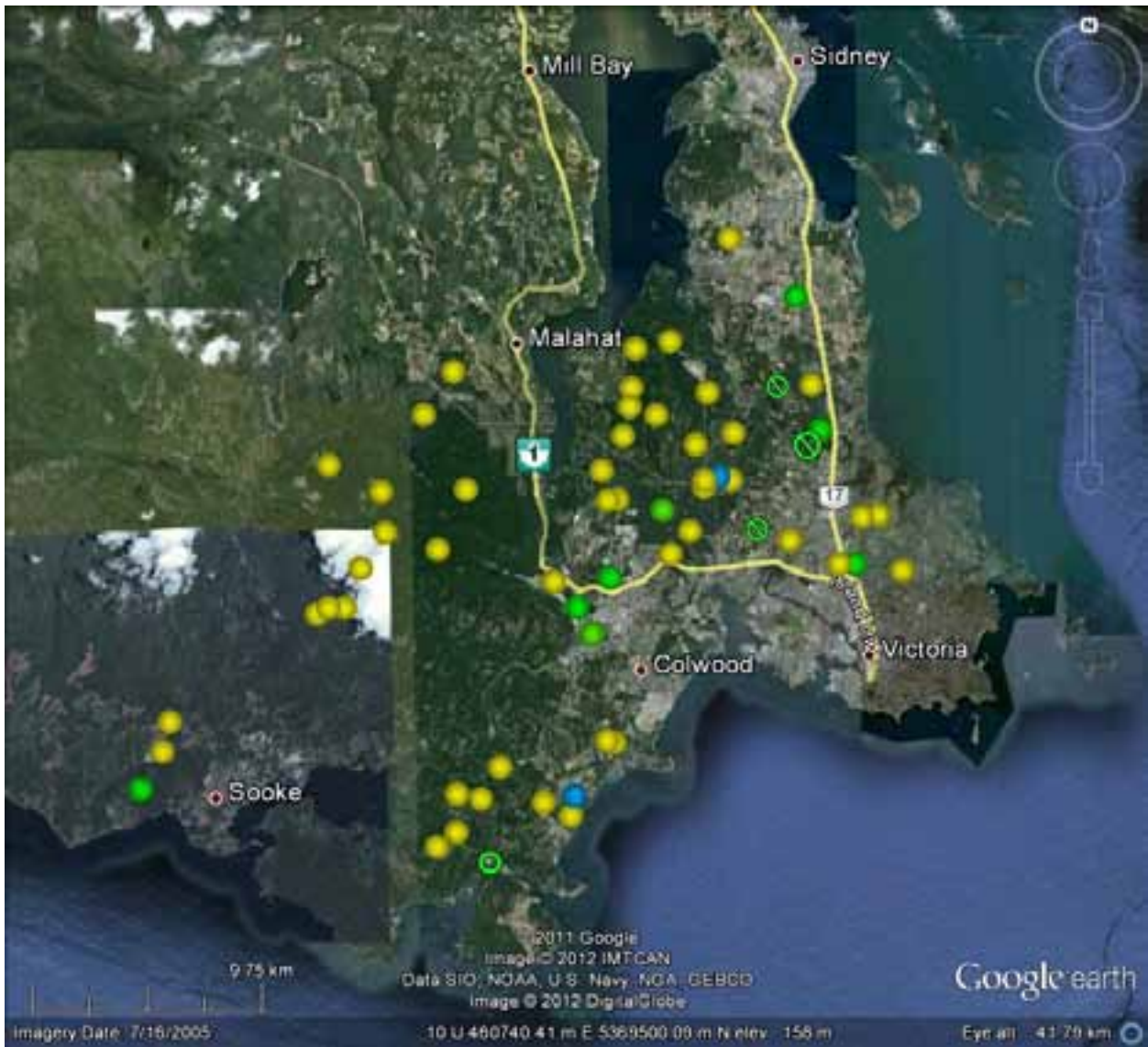
**Figure 1. Overview of survey sites on southern Vancouver Island and Gulf Islands, 2008 - 2011.**

Yellow symbols – turtle survey sites (HAT data). Map created with GoogleEarth®; data sources at bottom of the map refer to the base-map.



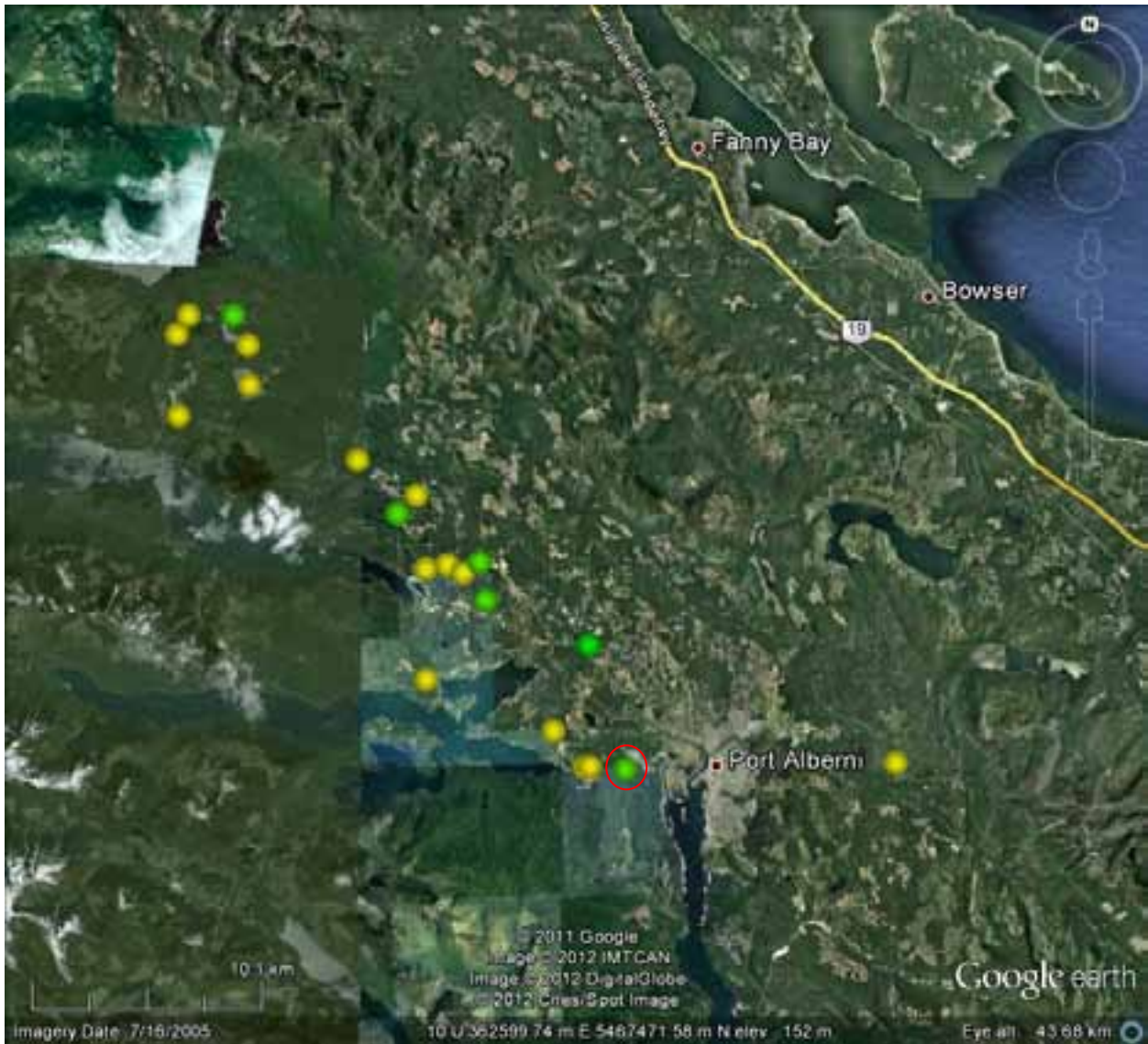
**Figure 2. Survey sites and locations where the Western Painted Turtle was found within Capital Regional District, 2008 – 2011.**

Green symbol – Western Painted Turtle found; Yellow symbol – Site surveyed but Western Painted Turtle NOT found; Blue symbol – Reliable resident report; Green open circle – road observation; Green cross-bar – road kill



**Figure 3. Survey sites and locations where the Western Painted Turtle was found in the Alberni Valley, 2008 – 2011.**

Green symbol – Western Painted Turtle found; red outline indicates new site confirmed in 2011; Yellow symbol – Site surveyed but Western Painted Turtle NOT found



### **Threat Assessment**

Threats were assessed at 18 sites and sub-sites where the Western Painted Turtle has been found from 2008 – 2011 (Table 3; see Appendix 2 . Threat assessment for sites where the Western Painted Turtle was found, 2008 - 2011. Appendix 2 for assessments by site). In Alberni Valley, turtles occur within private forestry lands, and recent logging has taken place in the vicinity of several occupied sites. The greatest threat to turtles in this area is probably from road mortality on busy logging roads. Turtles are vulnerable when travelling between water bodies and nesting sites on land or when dispersing over land. In addition, females often use gravel sides of roads for nesting, where the nests



and hatchlings are vulnerable to being crushed. Unauthorized recreational ATV use compound this problem, as overgrown spur roads that provide suitable nesting habitat and are impassable to other vehicles continue to receive use. At one site, ATVs, recreational target shooting, and garbage dumping were impacting communal nesting areas of the Western Painted Turtle. These threats were mitigated in spring 2011 (see **Chapter 6: Outreach and Stewardship**). The threat from logging was assessed as low because the dense forest adjacent to the water bodies is unlikely to be used by turtles. However, this assessment presumes that riparian buffers are retained and potential turtle nesting habitats and access to them are left undisturbed (see *Best Management Guidelines for Forest Lands* in Engelstoft and Ovaska 2010).

**Table 3. Summary of threats for sites where the Western Turtle was found in the Alberni Valley and Capital Regional District.**

| Threat rating                                | Roads - paved | Roads - unpaved | Recr. (motorized) | Recr. (non-motorized) | Pets | Exotic species | Housing/ industrial dev. | Urban activities | Logging |
|--|---------------|-----------------|-------------------|-----------------------|------|----------------|--------------------------|------------------|---------|
| <b>Alberni Valley (6 sites):</b>             |               |                 |                   |                       |      |                |                          |                  |         |
| No   | 6             | 2               | 5                 | 1                     | 6    | 0              | 6                        | 5                | 1       |
| Low  | 0             | 2               | 1*                | 5*                    | 0    | 1              | 0                        | 1                | 5       |
| Mod  | 0             | 1               | 0                 | 0                     | 0    | 1              | 0                        | 0                | 0       |
| High   | 0             | 1               | 0                 | 0                     | 0    | 0              | 0                        | 0                | 0       |
| Unknown                                      | 0             | 0               | 0                 | 0                     | 0    | 4              | 0                        | 0                | 0       |
| <b>Capital Regional District (12 sites):</b> |               |                 |                   |                       |      |                |                          |                  |         |
| No   | 1             | 5               | 10                | 0                     | 1    | 0              | 6                        | 1                | 0       |
| Low  | 4             | 6               | 2                 | 2                     | 5    | 0              | 5                        | 5                | 0       |
| Mod  | 6             | 1               | 0                 | 8^                    | 3^   | 1              | 1                        | 5                | 0       |
| High   | 1             | 0               | 0                 | 2                     | 2    | 9              | 0                        | 1                | 0       |
| Unknown                                      | 0             | 0               | 0                 | 0                     | 1    | 2              | 0                        | 0                | 0       |

\*Threat rating at 1 site reduced from "High" due to mitigation on nesting grounds in 2011.

^Threats from pets and visitors mitigated through the installation of fence at communal breeding sites.

Within CRD, the Western Painted Turtle occurs within highly fragmented landscapes amidst residential areas. Habitat alteration due to housing developments and/or urban activities, such as landscaping or construction of walls along lakeshores, was identified as a threat at some occupied sites. Occupied sites include several CRD Regional Parks and other protected areas. However, even within areas protected from development, turtles face many threats, including road kill, disturbance from recreational activities and roaming pets, and urban activities in the surrounding areas. Road mortality of hatchling turtles has been documented repeatedly over several years at one site near the entrance to Elk/Beaver Lake Park (Engelstoft and Ovaska 2011). The hatchlings probably originated from nests in the gravel shoulder of the road, where an emerged nest hole was found in spring 2010. In spring 2011, this site was heavily impacted by trucks and machinery from a nearby construction site that parked and turned on the road shoulder.

Introduced Sliders, Bullfrogs, fish, and other species are prevalent in water bodies throughout CRD. Introduced Sliders and other turtles might compete with the Western Painted Turtle for nesting sites or food and/or spread diseases (Kilburn 2009), and bullfrogs could prey on hatchlings; such deleterious effects are possible but undocumented. Sliders are known to occur in most water bodies (8 of 9) occupied by the Western Painted Turtle in CRD; in Alberni Valley, in contrast, Sliders were documented from only one of 6 water bodies occupied by the Western Painted Turtle (Table 2; Appendix 1). At some sites, such as Swan Lake and Elk-Beaver Lake, numbers of Sliders are relatively high, raising concerns about their impacts on the Western Painted Turtle.

## ***Conclusions and Recommendations***

In 2011, we surveyed 16 water bodies for turtles in Alberni Valley and on southern Vancouver Island within CRD. We encountered the Western Painted Turtle at five sites, one of which, McKenzie Slough in Alberni Valley, represents a new locality record for the species. As part of this project, from 2008 – 2011, we have conducted 232 surveys of 96 water bodies for turtles and have found the Western Painted Turtle at 15 sites; a small number of additional records exist based on road kills and reliable landowner reports. In Alberni Valley, turtles occur within forestry lands, and logging roads pose a potential threat to turtles through road kill. In CRD, turtles inhabit water bodies amidst residential areas, including CRD Regional Parks and other protected areas. Threats to turtles accrue from various sources, including habitat alteration from housing developments and landscaping activities outside parks, road kill, disturbance from recreational activities, roaming pets, and potentially from introduced turtles and bullfrogs.

### Recommendations:

- Expand survey coverage to areas where significant data gaps exist, including much of the east coast of Vancouver Island north of CRD.
- Document road mortality of turtles and identify potential problem areas; engage the public in reporting road kills.
- Clarify potential threats from introduced Sliders and Bullfrogs.

## **Chapter 2: Nesting Ground Monitoring and Restoration**

### ***Corresponding Objective:***

Objective 2: Enhance Nesting Habitat: Monitor known nesting areas and engage in nesting habitat enhancement/ restoration.

### ***Rationale***

Availability of suitable safe nesting areas is a limiting resource for Western Painted Turtle populations in many areas, including the Pacific Coast. Relatively little is known of nesting ecology of the Pacific Coast Population that inhabits an environment very different from that in interior B.C. Information is needed on nesting ecology and on habitat enhancement measures that are effective for turtles on the Pacific coast.

### ***Approach & Methods***

During the 2011 field season, with help from volunteers, we engaged in nesting habitat enhancement and creation at two sites that were previously identified as benefitting from such actions (Engelstoft and Ovaska 2011). The sites were in Elk/Beaver Lake Regional Park and in Alberni Valley, and the activities were carried out in collaboration with landowners/managers, CRD Regional Parks and Island Timberlands, respectively. In addition, we monitored turtle nesting activities and the effectiveness of habitat enhancement carried out in 2010 in Elk/Beaver Lake Regional Park, where Western Painted Turtle nesting sites have been monitored annually since 2008, and in Swan Lake and Christmas Hill Nature Sanctuary, where nesting habitat enhancement took place in 2010.

At Elk/Beaver Lake Regional Park, methods for obtaining information on nesting ecology were as in 2010 and consisted of frequent visits to the site in spring and summer when hatchlings were expected to emerge and egg-laying was expected to take place (see Engelstoft and Ovaska 2011 for details on how nests were identified and mapped).

At Elk/Beaver Lake Park, we set up enhancement and restoration projects as experiments to test the effectiveness of the methods used. The treatments consisted of removing vegetation and exposing bare soil at one site and adding sand and soil in different proportions at another site. Those treatments that prove most successful can then be expanded in the future.

### ***Results & Discussion***

#### **A. Elk/Beaver Lake Regional Park: Nesting Area Monitoring**

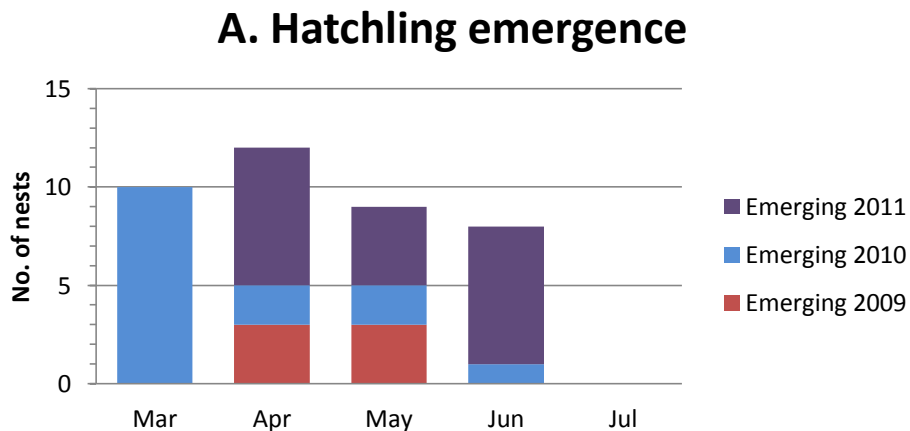
From 11 March to 30 July 2011, we made a total of 49 visits to known nesting areas near Beaver Lake, focusing on a previously identified communal nesting ground (referred to as East Pond site) and nearby areas, which included surroundings of another pond (West Pond site), Elk-Beaver Lake Equestrian Society (EBES) grounds,

and gravel access road and associated driveways. There were two additional visits in autumn (29 Sept and 4 Nov) 2011 to determine whether any emergence of hatchlings from eggs laid the same year had taken place. During the visits, we took care to minimize disturbance to the turtles and the habitat.

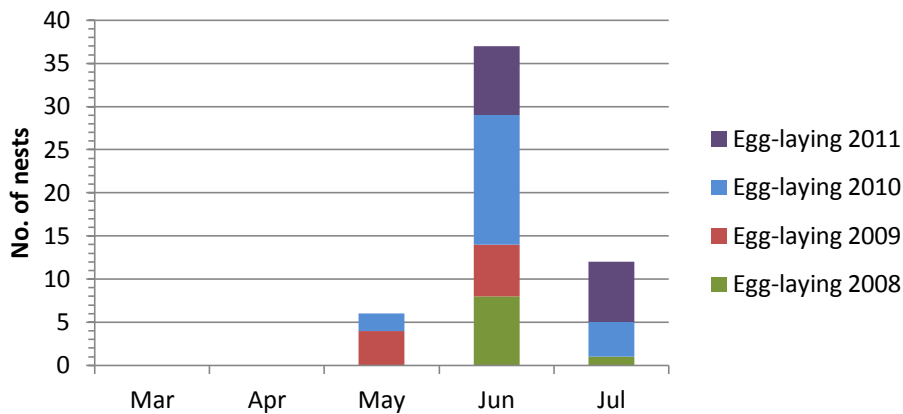
From 5 April – 17 June 2011, we found a total of 18 emerged nests, 15 of which were at the East Pond communal nesting area, one by West Pond, and two within EBES grounds. Hatchlings began emerging later in spring of 2011 than in previous years, probably due to cool and wet conditions, and hatching continued well into June (Figure 4). Hatchlings overwintered in the nests, and we have found no evidence of hatchling emergence from nests in the autumn at this site.

From 6 June – 16 July 2011, we found a total of 16 new Western Painted Turtle nests, 11 of which were at the communal nesting area by East Pond, three were within EBES grounds, and two were along a gravel driveway near the park entrance; the latter nests were shown to us by a volunteer from CRD Parks, who also photographed the nesting females. Western Painted Turtles began egg-laying somewhat later in 2011 than in previous years (Figure 4). Eight of the nests were dug by turtles in June and 7 in July. No nesting was documented in May, a stark contrast to 2009 and 2010.

**Figure 4. Timing of hatchling emergence (A) and egg-laying (B) by the Western Painted Turtle at Elk/Beaver Lake Regional Park, based on data from a communal nesting area and nearby sites.**



## B. Egg-laying



At the East Pond site, nest success, as indicated by the proportion of emerged nests, has been relatively high since monitoring began and has ranged from 50% to 77.8%. Intensive search effort in 2010 resulted in the finding of numerous nests, of which 63.2% emerged successfully in spring 2011 (Table 4). One Red-eared Slider nest found at this site in summer 2010 did not hatch.

**Table 4, Summary of emerged nests at East Beaver Pond, 2009 - 2011.**

Note: Emergence occurs in spring of the year following egg-laying; follow shaded cells from left to right for nest success.

| Year | # new nests (with eggs) found <sup>1</sup> | # emerged nests known from previous year | % nests emerged | Total # emerged nests found |
|------|--|--|-----------------|-----------------------------|
| 2008 | 10   | NA                                       | NA              | 4 <sup>2</sup>              |
| 2009 | 9  | 5  | 50.0            | 14                          |
| 2010 | 19 <sup>3</sup>                            | 7  | 77.8            | 15                          |
| 2011 | 13   | 12                                       | 63.2            | 15                          |

<sup>1</sup>New nests refer to nests identified by an observation of a female digging and completing a nest and/or sign of recent nesting (circular, flat wet spot) detected the day after egg-laying.

<sup>2</sup>Underestimate; monitoring began in June after emergence was completed.

<sup>3</sup>Excludes 1 nest by unknown species and 1 nest of Red-eared Slider both in July

Nests of freshwater turtles frequently suffer from high rates of predation (COSEWIC 2006). Two of the new nests found in 2011 were dug up, probably by raccoons. One of the predated nests was at EBES grounds immediately adjacent to a newly enhanced nesting area; the nest was constructed on 5 July and was found dug up on 19 July with broken eggs scattered on the surface. The other nest was found on 6 June along a gravel driveway off the access road to the park and was predated on 23 October;

several broken eggs with well developed embryos were strewn around (K. Preston, pers. comm.). To date, we have found no evidence of nest predation at the East Pond communal nesting area, but on several occasions we did encounter new complete nests, sometimes with eggs, that were left uncovered. The female had probably been disturbed by people or pets before completing nesting in this heavily used recreational area.

### **B. Elk/Beaver Lake Regional Park: Nesting Habitat Experiment at Beaver Ponds**

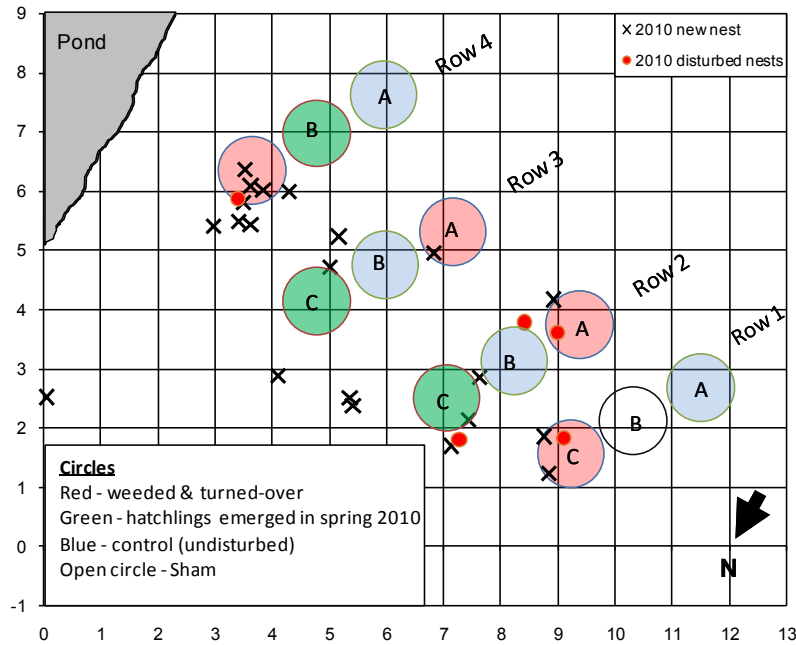
Disturbance to emerging and nesting turtles and encroachment of grass and weeds were identified as the main problems for turtles nesting by both East and West Ponds (Ovaska and Engelstoff 2010, Engelstoff and Ovaska 2011). In spring 2010, we began an experiment to investigate the effectiveness of tilling as a method for nesting habitat enhancement. We tilled small (1 m<sup>2</sup>) circular plots by East Pond, where turtles are nesting communally within an area of approximately 10 m x 12 m. An additional treatment consisted of plots where one or more nests had successfully emerged in spring 2010 from eggs laid in 2009. Other similar-sized, unmodified plots served as controls. The experimental plots were established in 4 rows of three plots, and plots within each row were randomly assigned to treatments (Figure 5). An additional row of 3 plots was located at the nearby West Pond, resulting in a total of 5 replicates.

As reported previously (Engelstoff and Ovaska 2011), Western Painted Turtles readily used the newly tilled plots for nesting in 2010 (Figure 5A; Table 5A). Monitoring of the site in spring 2011 revealed that nests in the tilled plots produced more emerged nests than did the other plots (Figure 5B; Table 5B). However, tilling did not increase the rate of nesting success or the total number of nests at the site when compared to pre-enhancement years (see previous section). Other factors, such as weather conditions in particular years, might have an over-riding influence. However, the habitat enhancement probably retarded further deterioration of the habitat due to vegetation in-growth and allowed the maintenance of nesting activity at pre-enhancement levels. A number of turtles nested adjacent to the experimental plots within the communal nesting area, usually at sites where the ground was patchily vegetated.

**Figure 5. Set-up of experimental habitat enhancement plots and their use by nesting turtles at the East Pond site in Elk/Beaver Lake Regional Park.**

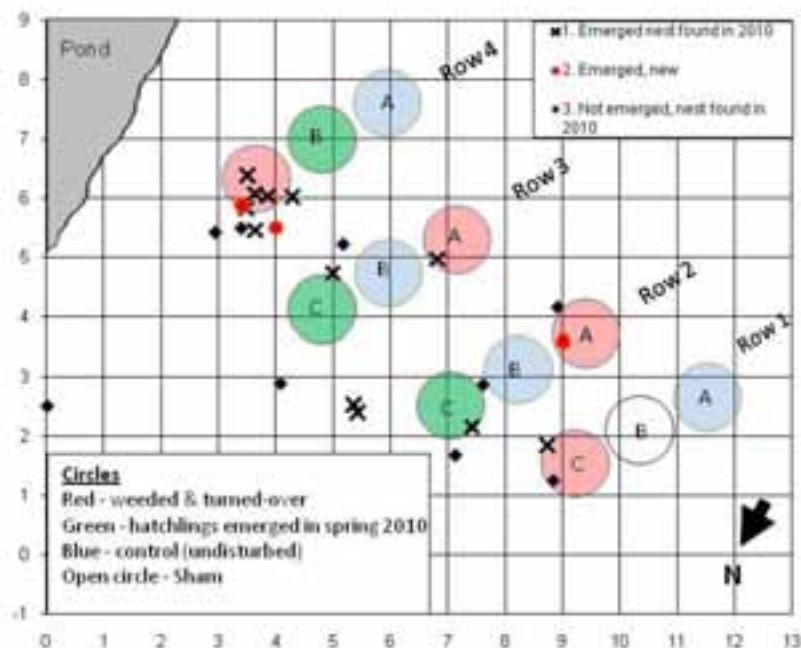
Large circles represent treatment plots.

**A. New nests in Experimental Plots in summer 2010.**



Disturbed nest refers to events where a complete but uncovered nest was found.  
New nests refer to completed, covered nests; Most are Western Painted Turtles, but they include one Red-eared Slider nest and one nest found in July for which species of turtle is uncertain.

**B. Emerged nests in Experimental Plots in spring 2011.**



**Table 5. Number of new Western Painted Turtle nests in summer 2010 (A) and number of emerged nests in spring 2011 (B) on experimental habitat enhancement plots.**

**A. New nests in Experimental Plots in summer 2010.**

| Treatment                             | East Pond       |                 | West Pond       | Total |
|---------------------------------------|-----------------|-----------------|-----------------|-------|
|                                       | Completed nests | Disturbed nests | Completed nests |       |
| Newly-tilled plots <sup>1</sup>       | 8               | 3               | 2               | 13    |
| 1 yr-used plots <sup>2</sup>          | 2               | 0               | 0               | 2     |
| Control plots <sup>3</sup>            | 0               | 1               | 0               | 1     |
| Other sites within the nesting ground | 11              | 1               | 0               | 12    |
| Total                                 | 21              | 5               | 2               | 28    |

**B. Emerged nests in Experimental Plots in spring 2011.**

| Treatment                             | Emerged (nest found in 2010) | Emerged (nest not found in 2010) | Not emerged (nest found in 2010) | Total |
|---------------------------------------|------------------------------|----------------------------------|----------------------------------|-------|
| Newly-tilled plots <sup>1</sup>       | 7*                           | 2                                | 2*                               | 11    |
| 1 yr-used plots <sup>2</sup>          | 2                            | 0                                | 0                                | 2     |
| Control plots <sup>3</sup>            | 0                            | 0                                | 0                                | 0     |
| Other sites within the nesting ground | 4                            | 1                                | 7                                | 12    |
| Total                                 | 13                           | 3                                | 9                                | 25    |

<sup>1</sup>Weeded & turned over

<sup>2</sup>Successful nests constructed in summer 2009 and emerged in spring 2010

<sup>3</sup>Unmanipulated; not used by turtles the previous year

\*Includes 1 nest at West Pond where there was 1 set of treatment plots (not shown in Fig. 5)

After hatchlings had emerged in spring 2011, we continued the experiment by tilling the previous year's control plots that were covered with grass and that had contained no nests in at least two years. We predicted that turtles will preferentially construct nests in these newly tilled plots over plots that were tilled the year before and were already growing in with weeds (1yr-tilled plots) and over plots that were successfully used by turtles two years previously (2 yr-used plots). The latter served as control plots, as they were unmanipulated. However, the ground was more open at these sites than in the vegetated plots used as controls the year before. The new 2011 experimental set-up and its relation to that in 2010 are shown in Table 6.



**Table 6. Experimental set-up for nesting habitat enhancement at Elk/Beaver Lake Regional Park, showing the consecutive use of plots for different treatments in 2010 and 2011.**

| Treatment plots in 2010  | Treatment plots in 2011   | # plots (East Pond) | # plots (West Pond) | Total |
|--|---|---------------------|---------------------|-------|
| Newly-tilled (weeded & turned over in May-June 2010)                               | 1 yr-tilled (weeded & turned over in May-June 2010)   | 4                   | 1                   | 5     |
| 1 yr-used (successful nests constructed in summer 2009 and emerged in spring 2010) | 2 yr successfully used (successful nests constructed in summer 2009 and emerged in spring 2010) | 4                   | 1                   | 5     |
| Control (unmanipulated/not used previous year by turtles)                          | Newly-tilled (weeded & turned over in June 2011)  | 4                   | 1                   | 5     |

In summer 2011, we found a total of 17 nests at the East Pond experimental site: 11 completed nests, 4 completed but uncovered (disturbed) nests, and 2 possible nests, identified by sign only (Table 7). Eleven nests were on the newly-tilled plots, 1 was on a plot successfully used by turtles 2 years previously, and 5 were outside the plots but within the nesting area (Figure 6). There were no nests on the plots tilled 1 year ago at East Pond or on any of the plots at West Pond.

**Table 7. New nests found at East Pond experimental site in 2011.**

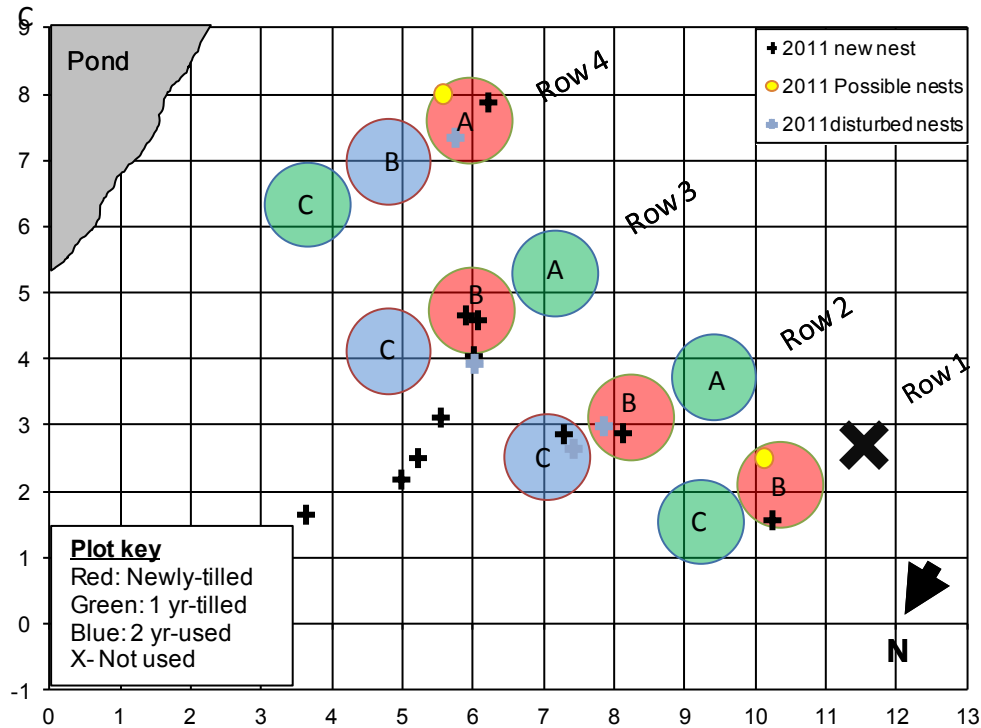
There were no nests at the West Pond experimental site.

| Treatment                                 | Completed nests | Possible nests | Disturbed nests | Total |
|---|-----------------|----------------|-----------------|-------|
| Newly-tilled plots <sup>1</sup>           | 6               | 2              | 2               | 10    |
| 1 yr-tilled plots <sup>2</sup>            | 0               | 0              | 0               | 0     |
| 2 yr-successfully used plots <sup>3</sup> | 1               | 0              | 1               | 2     |
| Other sites within the nesting ground     | 4               | 0              | 1               | 5     |
| Total                                     | 11              | 2              | 4               | 17    |

Similar to the previous year, the 2011 experiment confirms that turtles preferentially use newly tilled plots and that tilling of even small plots is an effective habitat restoration measure at sites where vegetation in-growth is a problem. However, continuous maintenance is needed, as plots tilled the year before ceased to be effective. They were rapidly invaded by weedy herbaceous plants but could probably be restored with relative ease by pulling out the weeds. Packing the soil more firmly may also be effective against weed establishment and for encouraging nesting turtles. In both years,

turtles tended to nest along the edges of the tilled plots against the firm ground, rather than in the middle where the soil was looser, suggesting that a firm, compact ground is desirable. Alternatively, the interface between the untilled and tilled ground provided a slight angle, which may have facilitated nest construction.

**Figure 6. Use of experimental plots by nesting Western Painted Turtles at East Pond in June - July 2011.**



Fencing of the East Pond communal nesting area:

CRD Parks erected wire fencing around the communal nesting area in September 2011 to reduce disturbance from recreational users and pets. The fence has a gap at the bottom to allow turtles to move freely to and from the area. This more permanent fence replaces a temporary enclosure erected in 2010, which diverted an unofficial trail that intersected the site and showed promise in reducing disturbance to nesting turtles. It is important to keep cutting the grass and pulling up broom within the enclosure to maintain the open nature of the habitat.

**C. Elk/Beaver Lake Regional Park: Nesting Habitat Enhancement**

Multi-use areas southwest of Beaver Lake contain important nesting habitat for the Western Painted Turtle. On 2 June 2011, in collaboration with CRD Parks, Elk-Beaver Lake Equestrian Society (EBES), and volunteers from Starbucks and CRD Parks, we engaged in nesting habitat enhancement at two sites: EBES facility where turtles have been nesting on paths and other unsafe areas, and communal nesting area by East Pond, which is suffering from vegetation in-growth and where a habitat enhancement experiment was conducted, as described in the previous section. A pictorial summary of

the project was prepared and distributed to collaborators and participants (Appendix 3) and an article of the project appeared in the CRD newsletter (Appendix 4). The following summary is extracted from that document with minor modifications.

The EBES enhancement site, adjacent to a horse exercise ring, was selected because of its known previous use by turtles. First, the ground was cleared of weeds, and piles of sand and soil were brought in, courtesy of CRD Parks. EBES donated a pile of sand already present at the site. The substrate was deposited along two east-west oriented rows, gently sloping to the south to provide warm nesting sites for turtles. Two types of substrates were used to examine preferences by turtles: sand and a mixture of 60% sand/40% soil. The two substrates were deposited along the ridges within alternating 1 x 1 m grids. Many wheelbarrow loads of sand and soil were used to provide sufficient depth (20 cm or more) to the nesting area. The site was enclosed with a two-tier cedar “snake fence” to discourage inadvertent disturbance by the public. Only one turtle nest was found within the enclosure in 2011; this nest was predated soon after egg-laying. We observed disturbance by people and horses within the enclosed area on several occasions, and a higher fence, which currently is only approximately 1 m high, is needed. The effectiveness of the enhancement cannot be assessed accurately after only one season, and it is expected to improve with time as more turtles encounter it. Thistles and blackberries that invaded the enhanced site were removed in autumn 2011, and continued efforts are required to keep this area weed-free.

The other nesting habitat enhancement site was by a small pond (East Pond) in an area co-managed by CRD Parks and the Vancouver Island Retriever Club, who originally dug the pond about 30 years ago. Turtles come here from the lake and communally nest within a small area next to the pond. The site is getting overgrown with grass and weeds. In 2010, we experimentally weeded and turned over four 1 m<sup>2</sup> plots within this area, and turtles preferentially nested in these bare patches. In 2011, with help from hard-working volunteers, we similarly tilled four additional plots that had served as control plots in 2010 but were not used by nesting turtles. Turtles preferentially nested within the turned-over plots, and tilling is an effective way of enhancing nesting habitat at this site (see previous section, **Nesting Habitat Enhancement at Beaver Ponds**, for detailed results).

#### **D. Swan Lake and Christmas Hill Nature Sanctuary**

Turtle nesting habitat was enhanced in June 2010 at Swan Lake (Engelstoft and Ovaska 2010). Three turtle nests were recorded from this site in June – July 2010, soon after restoration: two Western Painted Turtle nests and one Slider nest. Several additional turtle nests of both species were found in nearby areas on the property in 2010. Monitoring of the new nesting area and other known nests in spring 2011 revealed no emerged nests. The reason for the nest failure is unclear, but for the Western Painted Turtle it may be related to cool, wet conditions in spring 2011. One successfully emerged Western Painted Turtle nest was found at Swan Lake in 2009, and the presence of very small turtles in the lake suggests successful breeding in at least some years. Introduced Sliders may not be able to complete embryonic development in cool

northern climates (Kilburn 2009); prolonged warm periods in summer, predicted by climate change models, may allow for successful nesting in the future.

On 20 - 21 June 2011, volunteers and visitors recorded 4 new turtle nests at the restored site and a possible nest in the native plant garden in the vicinity of this site. These observations include a nesting radio-tagged turtle photographed by a visitor at the restored site, and three additional nests, identified by sanctuary staff based on characteristic sign of new nests (a wet spot and recently disturbed ground). An additional nesting attempt (a “test hole”) was noted at the restored site on 4 July. Additional nests are possible, as completed nests are almost impossible to detect after more than about a day, and we plan to monitor the site for emerging hatchlings in spring 2012.

### **E. Alberni Valley: Nesting Habitat Enhancement at “Airport Wetlands”**

Western Painted Turtles occur on forestry lands in Alberni Valley, where suitable nesting areas appear to be in short supply. On 27 May 2011, in collaboration with Island Timberlands and volunteers from Alberni Valley Enhancement Society, we engaged in nesting habitat enhancement at a site where turtles have been observed nesting in previous years. A pictorial summary of the project was prepared and distributed to collaborators and participants (Appendix 5). The following summary is extracted from that document with minor modifications.

The restoration site is approximately 50 m from a wetland in an abandoned gravel pit. Numerous nesting attempts have been observed there from 2008 – 2010, including a few nests with emerged hatchlings, but the hard-packed ground and coarse gravel substrate appear to hinder successful nesting. The site had been used for unauthorized dumping and target practice; the first task was to clear the site from accumulated garbage. Heavy machinery was brought in to prepare the ground, courtesy of Island Timberlands. A truckload of sand was brought in and deposited along two ridges aligned east to west to provide a warm, south-facing nesting area for turtles. Sand was used instead of sand/soil mixture to discourage the growth of weeds and the necessity for weeding at this relatively remote location. The ridges were shaped to create a gentle slope on the south-facing side. They were then raked, and the sand was compacted by walking on it. A barrier of large boulders was installed to prevent unauthorized vehicle access to the site, and the spur road leading to the site was deactivated.

In addition to sponsoring the nesting site enhancement, Island Timberlands installed boulders at the entrance of another, short spur road where turtles are nesting. The intention was to block ATV and vehicle access and prevent trucks using the spur as a turn-around site. Island Timberlands have also installed turtle crossing signs at strategic points along the logging road by wetlands to alert drivers to the possible presence of migrating turtles on roads.

## ***Conclusion and Recommendations***

At Elk/Beaver Lake Regional Park, we monitored nesting ecology of the Western Painted Turtle through the 2011 field season and continued experimental nesting habitat enhancement activities, begun in 2010. From 5 April – 17 June 2011, we found a total of 18 emerged nests at Elk/Beaver Lake Regional Park, 15 of which were within a previously identified communal nesting area (referred to as East Pond site). Hatchlings began emerging later in 2011 than in previous years, probably due to cool and wet conditions in spring, and unlike in previous years, hatching continued well into June. From 6 June – 16 July 2011, we found a total of 16 new Western Painted Turtle nests, 11 of which were at the East Pond site. Western Painted Turtles began egg-laying somewhat later than in previous years. No nesting was documented in May, in contrast to 2009 and 2010. At the East Pond site, nest success, as indicated by the proportion of emerged nests, has been relatively high, 50%– 77.8%, since monitoring began in 2008; it was 63.2% for nests laid in summer 2010 and emerged in spring 2011.

Together with volunteers and land owners/managers, we carried out nesting habitat enhancement projects in 2011 in Elk/Beaver Lake Regional Park in CRD and in Alberni Valley at sites that were previously deemed to benefit from enhancement. In Elk/Beaver Lake Regional Park, we engaged in nesting habitat enhancement at two sites in collaboration with CRD Parks, Elk-Beaver Lake Equestrian Society, and volunteers from Starbucks and CRD Parks. In Alberni Valley, we enhanced a nesting site where turtles had been observed nesting in previous years, in collaboration with Island Timberlands and volunteers from Alberni Valley Enhancement Society. A pictorial summary of each project was prepared and distributed to the collaborators and participants.

In Elk/Beaver Lake Regional Park, disturbance to emerging and nesting turtles and encroachment of grass and weeds were identified as the main problems for turtles nesting in the Beaver Lake area. In spring 2010, we began an experiment to investigate the effectiveness of tilling small (1 m<sup>2</sup>) plots as a method for nesting habitat enhancement. In both 2010 and 2011, female Western Painted Turtles preferentially constructed nests in newly tilled plots over plots from where hatchlings had emerged in the previous year or unmanipulated control plots (2010 experiment) and over plots tilled 1 year previously or from where hatchlings had emerged 2 years previously (2011 experiment). The newly tilled plots also resulted in more emerged nests in spring 2011 than did the other plots. These experiments show that turtles preferentially use newly tilled plots and that tilling of even small plots is an effective habitat restoration measure at sites where vegetation in-growth is a problem. However, continuous maintenance is required, as plots tilled the year before ceased to be effective and were rapidly invaded by weeds. Packing the soil firmly in tilled plots may be effective against weed establishment and for encouraging nesting turtles that appear to prefer compact nesting substrates.

At Swan Lake and Christmas Hill Nature Sanctuary, we restored a turtle nesting area in 2010 that had overgrown with weeds (Engelstoff and Ovaska 2011). Turtles began using the site almost immediately, but none of the 3 turtle nests, which included a Slider nest, emerged in spring 2011 for unknown reasons. Volunteers and visitors recorded 4

new turtle nests at the restored site in June 2011 and an additional nesting attempt in early July, documenting that turtles are using the site. We plan to monitor nesting success in spring 2012.

**Recommendations:**

Elk/Beaver Lake Regional Park:

- Continue monitoring the timing of hatchling emergence and egg-laying and nest success at known sites to obtain more complete picture of annual variation and longer term trends
- Monitor effectiveness of habitat restoration activities undertaken in 2011.
- Ensure that enhanced nesting sites remain in good condition and undertake weeding or other maintenance as needed.

## **Chapter 3: Enhancement of Aquatic Habitat**

### ***Corresponding Objective***

Objective 3: Enhance aquatic habitats by installation of basking logs. Specific objective for 2011 was to monitor the condition of previously installed basking logs to assess their effectiveness and to improve methods.

### ***Rationale***

In June 2010, basking logs were installed in several ponds that were deemed to benefit from additional basking sites for resident turtles (Engelstoft and Ovaska and 2011). Turtles are ectothermic (i.e., derive their body heat from the environment rather than from internally generated heat as in birds and mammals) and bask in the sun to elevate their body temperature; basking aids digestion and other vital processes (COSEWIC 2006). Monitoring the outcome of enhancement projects is necessary to ensure that the actions undertaken have the intended effect. It also allows for adjusting the techniques as required.

### ***Approach & Methods***

In June 2010, we installed basking logs at four sites within CRD: two ponds (East and West Pond) in Elk/Beaver Lake Regional Park, Trevlac Pond in and adjacent to Calvert Park, and Swan Lake in Swan Lake and Christmas Hill Nature Sanctuary (Engelstoft and Ovaska 2011). The installed basking sites consisted of logs or mill-end slabs (for convenience, all are referred to as basking logs), placed perpendicular to the shoreline and extending into the water with one end resting on the shore or secured to the shoreline vegetation. In 2011, we inspected the basking logs from boat to assess their condition. Where needed and feasible, we adjusted the position of the logs to restore their usefulness as basking sites. Monitoring the use of the basking logs by turtles was conducted in 2010 and reported previously (Engelstoft and Ovaska 2011).

### ***Results & Discussion***

#### **Elk/Beaver Lake Regional Park: Beaver Ponds**

In East Pond, there were four installed basking logs, two of which were actual logs (one with a board as a ramp) and two were mill-end slabs. We inspected their condition on 29 and 30 September 2011. Three of the four logs were still functional, but we noted some in-growth of shoreline vegetation, and as a result the logs did not extend as far out into the water as previously. However, the logs should remain functional for turtle use for another year. One of the logs had been submerged by the weight of the encroaching vegetation, and it was not possible to restore it. The situation was similar in West Pond, where three of the four basking logs were still functional. One log could not be found and had either drifted off or sunk.

On 6 April 2011, a Double-crested Cormorant was perched on one of the basking logs in West Pond, a new species to use the basking logs in addition to the variety of turtles and wildlife recorded in 2010 (Engelstoft and Ovaska 2011).

## **Swan Lake and Christmas Hill Nature Sanctuary**

At Swan Lake, there were 13 basking logs, installed in 2010, and two floating boards that had been installed previously. All but one of the basking logs installed in 2010 consisted of mill-end slabs; one large log had been lifted by crane into the lake for turtle basking sites by Swan Lake Nature Sanctuary staff. On 29 Sep 2011, we inspected most of the basking logs. Five of the seven inspected logs in the main part of the lake had been submerged by the weight of the encroaching vegetation, and a quick assessment from the boardwalk of the remaining 5 basking logs in the west bay suggested a similar situation there. It was usually not possible to re-install the submerged logs, because they were well wedged in and deeply submerged, but we were able to do so in two cases. A group of Camosun College Environmental Technology students are currently (in early 2012) working with us to develop and install structures better suited for long-term basking site enhancement.

## **Trevlac Pond**

Five basking logs were installed in 2010 at this site, all of which were mill-end slabs. There were also two floating boards installed previously by the landowners. During an inspection on 4 Oct 2011, we found that two of the slabs were still functional, one was partially submerged, and two were fully submerged. The submerged slabs were very thin at one end, which probably hastened their water-logging. We were able to prop and reposition all the submerged slabs. The two floating boards were still in place.

## ***Conclusion and Recommendations***

In 2010, we installed basking logs, consisting mostly of mill-end slabs, in four water bodies within CRD to enhance the aquatic habitat for turtles. The basking logs appeared to be an instant success with turtles using them within an hour of installation and continuing to use them throughout the summer in 2010. However, while some logs continued to be functional in 2011, many had sunk either due to shoreline or aquatic vegetation in-growth or to water-logging. This finding emphasizes the importance of monitoring the effectiveness of habitat enhancement projects beyond the first year. The work to redesign basking logs and their anchoring method suited to sites with rapid shoreline vegetation growth is planned for 2012.

### **Recommendations:**

- Redesign long-lasting basking structures and methods to anchoring them in wetlands and lakes with rapid shoreline in-growth.
- Install redesigned basking structures at Swan Lake and other, selected sites and monitor their use by turtles and their condition over time.
- Continue monitoring the use of basking logs by turtles at Trevlac Pond; engage residents by Trevlac Pond in this activity and encourage them to keep records of their observations.



## **Chapter 4: Mark-recapture and Telemetry Studies**

### ***Corresponding Objective***

Objective 4: Obtain information on movements and important seasonal habitats through telemetry and on population size, trends, and demography through mark-recapture studies.

### ***Rationale***

Detailed information on movements of turtles is needed to identify the location and characteristics of important habitats, such as nesting, hibernation, and foraging areas, and migration routes. Estimates of population size, trends, age-structure, and survivorship can be obtained through mark-recapture studies. This information is needed to develop appropriate management guidelines, to identify problem areas, and to apply appropriate threat mitigation measures.

### ***Approach & Methods***

In 2011, we continued a mark-recapture study started in 2010 at Swan Lake in Swan Lake and Christmas Hill Nature Sanctuary and initiated similar studies at two additional sites, Beaver Lake in Elk/Beaver Lake Park within CRD and “Airport Wetlands” in Alberni Valley. We captured turtles with hoop nets as described previously (see Engelstoft and Ovaska 2011 for details). We augmented trapping by capturing turtles with a long-handled dip net or by hand from the stern of a canoe.

We processed the turtles caught using standard methods and marked them for individual recognition with notching of scutes along the carapace edge. The methods and measurements taken are described in detail in Engelstoft and Ovaska (2011). All turtles were released after processing, usually within 15 – 30 minutes.

In 2011, we continued a telemetry study that was initiated in August 2010 at Swan Lake with the tagging of six adult Western Painted Turtles (Engelstoft and Ovaska 2011). With help from the nature sanctuary staff and volunteers, we obtained repeated fixes of their locations either from canoe or from vantage points on the shore throughout the year.

### ***Results & Discussion***

#### **Mark-recapture**

In 2011, we trapped turtles at three locations on Vancouver Island (Table 8). We used 4-6 hoop traps that were set for 1 to 3 days (with checks twice a day), resulting in a total of 39 trap-days and 124 checks (Table 8).

**Table 8. Summary of trapping effort and turtles caught at three sites on Vancouver Island in 2011.**

| Location                            | Period        | # of hoop traps | # of trap-days | # of trap checks | # of Western Painted Turtles | # of Sliders   |
|-------------------------------------|---------------|-----------------|----------------|------------------|------------------------------|----------------|
| Swan Lake (CRD)                     | 9-12 Aug      | 6               | 15             | 24               | 5                            | 2 <sup>1</sup> |
| Swan Lake (CRD)                     | 6 -7 Sep      | 6               | 6              | 12               | 1                            | 1 <sup>1</sup> |
| Beaver Lake (CRD)                   | 17-19 Aug     | 4               | 8              | 20               | 20                           | 2              |
| “Airport Wetlands” (Alberni Valley) | 27- 28<br>May | 4               | 4              | 8                | 0                            | 0              |
| “Airport Wetlands” (Alberni Valley) | 20-21 Sep     | 6               | 6              | 17               | 2                            | 0              |
| Total                               |               |                 | 39             | 124              | 28                           | 5              |

<sup>1</sup> Three subspecies: Red-eared Slider (*Trachemys scripta elegans*), Yellow-bellied Slider (*T. scripta scripta*), and Cumberland Slider (*T. scripta troosti*)

In total, we caught 33 turtles in the hoop traps. Trapping success, as measured by the number of turtles captured, varied among sites (**Error! Reference source not found.**). Trapping success of Western Painted Turtles was poor at Swan Lake, the site with the greatest effort, although the traps were set in the same places where they had been successful in 2010. Only 6 Western Painted Turtles and 3 Sliders were captured at this site in 2011, whereas in 2010 we caught 18 Western Painted Turtles and one Slider with less effort (Engelstoft and Ovaska 2011). Hoop traps were highly successful at Beaver Lake but not at Airport Wetlands (**Error! Reference source not found.**), probably due to the time of year; trapping at Airport Wetlands took place late in the season when the turtles might already have been preparing for hibernation. Hoop traps were set in clusters for logistic reasons at both the Airport Wetland and Beaver Lake. At Beaver Lake the traps were located in the north end of the lake. Most turtles (68%) were captured along the east shore of the small island with little aquatic vegetation. At Airport Wetlands the traps were set in the northwest corner, and the two Western Painted Turtle were captured in the same trap during subsequent checks.

We captured 14 additional turtles using a dip net or by hand from basking sites or from land after the turtle had laid eggs. The number of Western Painted Turtles caught by these means was as follows: 3 at Swan Lake, 6 at Beaver Lake, and 4 at “Airport Wetlands”. In addition, an introduced Reeve’s Pond Turtle (*Chinemys reevesii*) was captured in Beaver Lake on 30 Aug 2011(identified by C. Rombough, Oregon).

At Swan Lake, turtles have been trapped in two years, but the numbers are too small for a meaningful analysis. Three Western Painted Turtles (ID numbers L1.2.7, L1.3.7 and L1.3.9) were recaptures marked in 2010, resulting in a 16.7% recapture rate. One small turtle (L1.2.7) had grown substantially in length (from 101 mm to 1018 mm), width (from 78 mm to 89 mm), and height (from 40 to 45 mm) during the year between captures, whereas L1.3.7 was a relative large turtle (carapace length 197- 198 mm in 2010, 2011) had not grown. We had no baseline data for the third turtle. In the future, trapping earlier in the season might be more successful and allow us to obtain larger sample sizes.

The low number of Western Painted Turtles caught in traps (6 in 2011 versus 18 in 2010), low annual recapture rate, and the finding of two dead radio-tagged turtles (see **Telemetry**) raises concerns about a possible decline of the turtle population in Swan Lake. The lake receives run-off from the surrounding urban landscape and is highly

eutrophic, which in turn promotes copious algal growth. Seasonal die-off of aquatic vegetation can result in oxygen depletion in Swan Lake, and a die-off of fish in the lake in summer 2011 was associated with anoxic conditions (J. Pretzel, pers. comm.). Cyanobacteria (also known as blue-green algae) bloom occasionally but explosively in the lake (June Pretzer, pers. comm.). Cyanobacteria produce toxins (cyanotoxins) that accumulate in the organs, such as liver and gonads, of aquatic vertebrates (Chen *et al.* 2009). Whether turtles were affected by cyanotoxins in Swan Lake is unknown, but in other areas die-offs of turtles and other aquatic wildlife have been linked to cyanotoxins (Chen *et al.* 2009). It is also possible that turtles avoided the traps for an unknown reason. A survey of the lake on 31 August 2011 resulted in the location of 8 Western Painted Turtles of different sizes, 1 Slider, and 6 additional turtles that were not identified, suggesting that the poor trapping success may not be indicative of a population decline.

### Telemetry

In 2011, adult Western Painted Turtles outfitted with a radio-transmitter in 2010 were located a total of 58 times (Table 9). In summer 2011, two of the 6 tagged turtles were suspected to be dead because their movements had ceased, and their remains were found on 22 July 2011. Telemetry data indicated that turtle L1.3.6 had died between 24 and 29 October 2010 and turtle L1.3.5 between 21 and 29 May 2011. Only the carapace remained of each turtle. The carapace of L1.3.6, which had died the previous autumn, was bleached and somewhat eroded, whereas that of L1.3.5 was in perfect condition on a basking site along the shoreline. Neither carapace showed signs of predation. The telemetry tags were still attached, and the attachment sites on the shell were tidy and clean with no sign of entanglement or damage caused by the tags.

**Table 9. Number of fixes of radio-tagged Western Painted Turtles in Swan Lake from August 2010 to December 2011.**

| Turtles <sup>1</sup>    | From boat 2010 <sup>2</sup> | All surveys (foot & boat) 2010 <sup>2</sup> | From boat 2011 <sup>3</sup> | All surveys (foot & boat) 2011 <sup>3</sup> | Notes                               |
|-------------------------|-----------------------------|---|-----------------------------|---|-------------------------------------|
| L1.2.9-Luisa (female)   | 9                           | 31  | 54                          | 55  |                                     |
| L1.3.7-Johanna (female) | 8                           | 31  | 49                          | 50  |                                     |
| L1.6-Ted (male)         | 9                           | 32  | 57                          | 58  |                                     |
| L4&5 (male)             | 9                           | 32  | 55                          | 56  |                                     |
| L1.3.5 (female)         | 9                           | 32  | 26                          | 27  | Died between 21 and 29 May 2011     |
| L1.3.6 (male)           | 4                           | 19  |                             |   | Died between 24 and 29 October 2010 |
| Number of surveys       | 9                           | 33  | 58                          | 59  |                                     |

<sup>1</sup> Notch numbering system; three turtles were named by students of Camosun College Environmental Technology Program, who contributed the tags.

<sup>2</sup> Surveys from September to December 2010.

<sup>3</sup> Surveys from January to December 2011.

Tracking of the radio-tagged turtles was conducted throughout the year. Most surveys were from a canoe (Table 9), which provided the most accurate location information, but

some surveys were from vantage points on land. Extra effort was exerted in May 2011 in an attempt to find nesting sites (Figure 7).

The distance between fixes varied throughout the year. As expected, the turtles moved little between re-locations from late November to February, months when they hibernated, which is more correctly referred to as brumation<sup>1</sup> in reptiles (Figure 7). The measured distances between fixes during this period probably represent a combination of sampling error and periodic short movements by turtles. From March to June, the average movements increased from approximately 50 m to a peak of 200 m. In July and August, the turtles moved less, possibly concentrating their movement to the vicinity of feeding sites. In September, there was another peak in activity, before tapering off with the onset of brumation. The large variation associated with movements indicate either that some turtles move more than others, or that they remain in one centre of activity for some time and then undertake longer movements to another area (Figure 7).

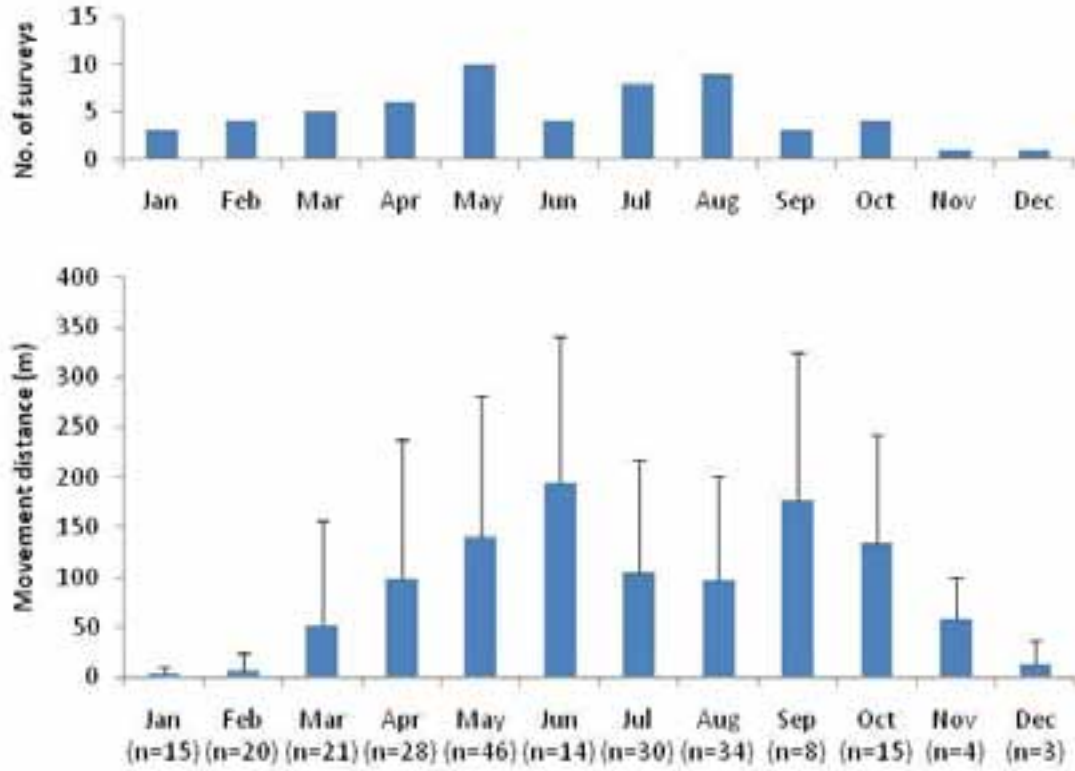
Average movements of females tended to be greater than those of males, but the sample sizes are small. In April 2011, the maximum distance female L1.3.5 moved was 464 m and the minimum was 65 m in 9 re-locations; these distances are greater than those by any other turtle that month. Females tended to move most in June, corresponding to the nesting period, and males moved most in autumn before brumation.

Over the year, the tagged turtles used much of the shoreline along Swan Lake (Figure 8), but their habitat use varied seasonally. Turtles hibernated in the southeast corner of the lake in both winters when they were tracked (Figure 9), while during the rest of the year they were widespread along the shoreline (Figure 8). In March, the turtles tended to be close to the hibernation site, spreading outward along the lakeshore as the weather warmed up. During the hottest time of the year (July – August), the turtles remained along the north shore. As the weather cooled, they started to move towards the hibernation site in the southeast corner of the lake.

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<sup>1</sup> Brumation – Period of winter dormancy in reptiles, during which their metabolic activity slows down.

Figure 7. Number of surveys (top panel) and average movements of 5 radio tagged Western Painted Turtles (bottom panel) in Swan Lake, 2011.



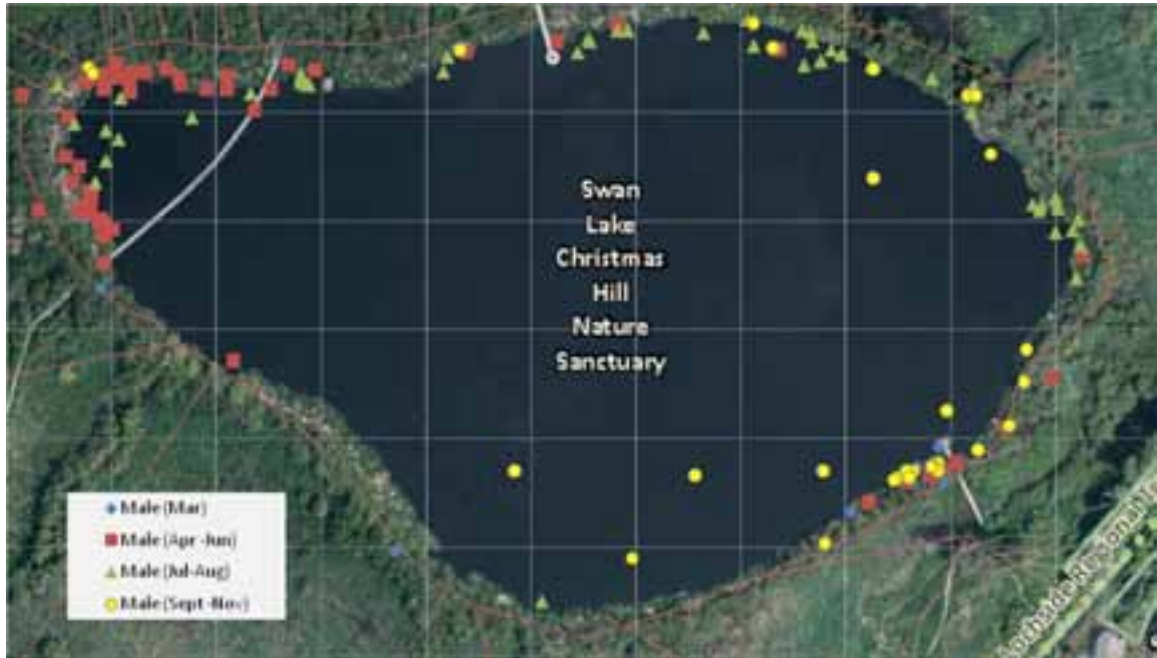
n – number of measured distances

top of bar – mean

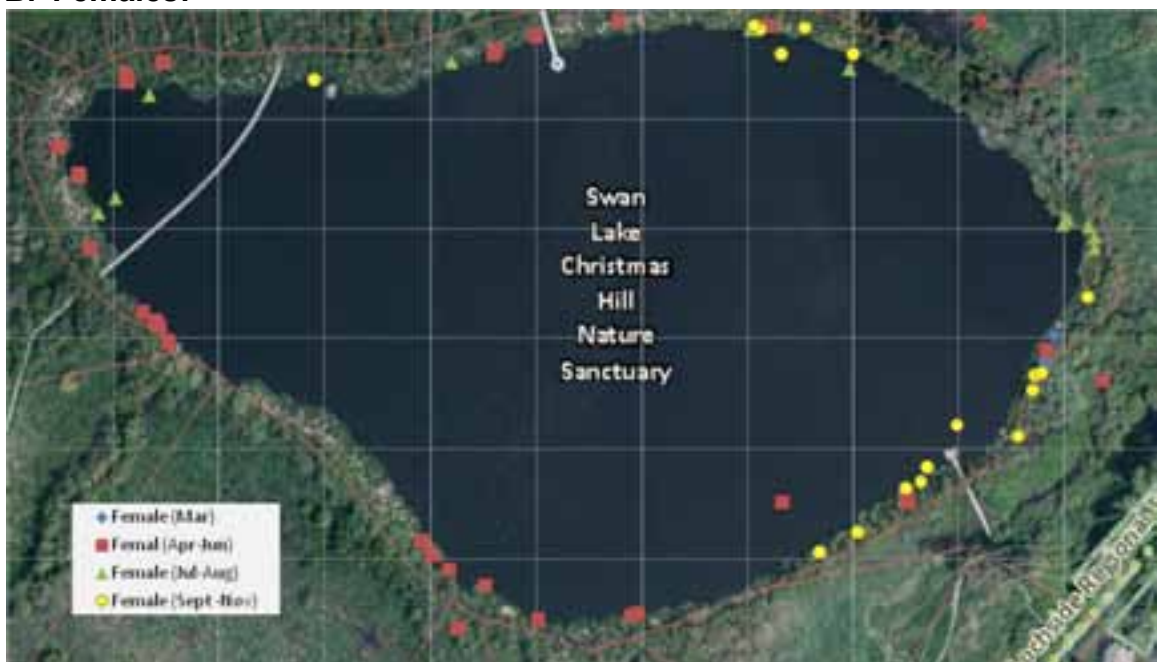
whisker – 1 standard deviation

Figure 8. Areas of lake used by four male and one female radio-tagged Western Painted Turtles from March to November 2011 at Swan Lake.

A. Males:



B. Females:



**Figure 9. Western Painted Turtle over-wintering area in Dec 2010 – Feb 2011 and in Dec 2011 in the southeast corner of Swan Lake.**



### ***Conclusion and Recommendations***

In 2011, we continued a mark-recapture study started in 2010 at Swan Lake in Swan Lake and Christmas Hill Nature Sanctuary and initiated similar studies at two additional sites, Beaver Lake in Elk/Beaver Lake Park within CRD and “Airport Wetlands” in Alberni Valley. We used hoop traps to capture turtles for a total of 39 trap-days and 124 trap checks, supplemented by capture with dip-nets or by hand. In total, we caught 40 Western Painted Turtles, 5 introduced Sliders, and a Reeve’s Pond Turtle, also introduced. Capture success was greatly reduced at Swan Lake from the previous year (18 Western Painted Turtles caught in 2010 versus 6 in 2011, although capture effort was greater in 2011, and only 3 turtles marked the previous year were recaptured. Mark-recapture studies at all three sites form baseline data for comparisons as more data accumulate.

In 2011, we continued to track movements of adult Western Painted Turtles outfitted with radio-transmitters in 2010 in Swan Lake. The tagged turtles used the same over-wintering sites in the southeast end of the lake in 2011 as in 2010. During the rest of the year, they were widespread along much of the shoreline of the lake, and none were observed leaving the area.

Recommendations:

- Continue mark-recapture studies to document population sizes, trends, and demography.

- Continue the telemetry study at Swan Lake to obtain information on important seasonal habitats and movements of turtles at and away from the lake; tag additional turtles as necessary; incorporate results into a management plan for the sanctuary.
- Initiate comparable mark-recapture and telemetry studies at additional sites, as deemed feasible within funding constraints.



## **Chapter 5: Management Guidelines**

### ***Corresponding Objective***

Objective 5: Develop management guidelines for landowners and managers.

### ***Rationale***

Stewardship by landowners/managers is essential for the protection and recovery of Western Painted Turtle populations within areas that are largely privately owned. Even populations within parks and other protected areas are not necessarily safe, unless human activities are managed taking into account the needs of the species. The objective is to provide land managers with tools to mitigate specific threats to turtle populations and habitats using best available information.

### ***Approach and Methods***

In 2010, we developed management guidelines for protecting Western Turtles and their habitat on forestry lands with focus on the Alberni Valley. In 2011, we developed corresponding guidelines for turtles in urban and rural areas, focusing on the Capital Regional District. Both sets of guidelines are available on HAT's Species at Risk web site ([speciesatrisk.hat.bc.ca](http://speciesatrisk.hat.bc.ca)) for comment and improvement by other turtle researchers and stewardship groups.

In addition to the above generalized guidelines and following approach used in previous years, we developed a personalized, site-specific guidelines document for one large property in CRD.

### ***Results & Discussion***

#### **Guidelines for Urban and Rural Areas**

The guidelines below were developed to help landowners and managers protect turtle populations and their habitats on their lands within urban and rural landscapes. The concepts are applicable for large landowners, such as reserves and parks, as well as for smaller private properties, although not all suggested activities apply to each property. The guidelines are posted on HAT's Species at Risk web site ([www.speciesatrisk.hat.bc.ca](http://www.speciesatrisk.hat.bc.ca)), where links are provided to other pages that elaborate particular points. For example, Point 1 (identification) is linked to a pictorial identification guide. These guidelines are intended to form a starting point, to be elaborated on and improved upon in the future. HAT's Species at Risk site, currently under development, contains additional details and illustrated examples of many of the recommended actions though links to additional pages.

## ***Landowner guidelines for improving habitat for the Western Painted Turtle in urban and rural areas***

### Get to know your turtles:

- Learn how to identify native Western Painted Turtle from introduced Sliders
- Document species and numbers of turtles using your property
  - Document observations with photos when possible
  - Note when turtles appear in the spring and when they disappear in the fall
  - What information to record

### Pond habitat enhancement:

- Manage shoreline and pond vegetation
  - Increase exposure of the pond to sunlight by trimming shoreline trees or shrubs
  - Encourage or plant native shore-line or aquatic plants
  - Add soil to increase productivity
  - Control in-growth of vegetation in the pond
- Maintain or improve water quality
  - Reduce or re-direct run-off
  - Reduce eutrophication
  - Maintain neighbouring septic systems in good working order
- Maintain or improve pond structure and accessibility to turtles
  - Increase deeper areas and clear vegetation from ponds that are in-grown with vegetation
  - Create shallow areas and make steep banks more gentle in portions of the pond
  - Maintain accessibility of turtles to nesting areas on land; where shoreline walls or other barriers exist, create gaps
- Install turtle basking sites
  - Install basking platforms or logs in sunniest areas of the pond and anchor them into the bottom or shoreline vegetation
  - Slanted basking structures are encouraged as they allow the turtles to climb up completely out of the water
- Minimize disturbance
  - Retain a portion of the shoreline inaccessible; avoid circling the entire perimeter with trails or manicured lawns/gardens
  - Place docks and viewing points in selected accessible areas of the shoreline

### Nesting habitat enhancement:

- Maintain or enhance existing nesting areas
  - Identify nesting habitats on the property, so that disturbance from construction and yard maintenance activities can be avoided
  - Maintain open nature of the nesting area to ensure a good exposure to sunlight
  - Maintain sparse ground cover and open, non-vegetated patches; weeding may be necessary at an appropriate time (after previous year's hatchlings have emerged but before females have started nesting in spring).
  - Monitor the effectiveness of the actions
- Create new nesting habitat
  - Select an exposed, sunny and safe site close to water (but above flood level) and accessible to turtles; avoid sites where turtles have to cross a road
  - Clear the site from vegetation and bring in sandy substrates, as needed.
  - Construction can take place anytime but is best done shortly before the nesting season in spring (be careful not to destroy existing turtle nests)
  - Maintain the site clear of weeds and disturbance
  - Monitor the use of the site by turtles
- Protect nesting sites from disturbance
  - Place docks and other structures away from nesting areas and redirect paths
  - Fence nesting habitat or individual nests, as needed, but ensure that turtles can move freely under the fence
  - Manage pets and prevent them from digging and running in nesting areas

### Monitor effectiveness of restored habitats:

- Document turtles using the restored basking sites or nesting areas
  - Record numbers of turtles or their sign seen at restored sites
  - Document your observations with photos when possible
- Document condition of the restored habitat
  - Do the sites remain functional over time?
  - Was any action, such as weeding of the nesting areas, undertaken?

### **Mitigating road mortality:**

- Discourage turtles from nesting in unsafe locations, such as busy parking sites or driveways
- In some cases where turtles are nesting in unsafe sites such as roads, turtles can be encourage to nest in nearby new, safer nesting areas
- Inform family, friends, and visitors of the possible presence of turtles on roads and driveways, especially during the nesting season in spring and early summer
- Place turtle crossing signs where turtles are seen crossing roads

### **Site-specific Guidelines**

Personalized, site-specific habitat management guidelines were prepared for one large landowner, Capital City Allotment Gardens, in Saanich. Gardeners have repeatedly reported turtle sightings, including nesting observations from the allotment gardens. The site is contiguous with Swan Lake through Swan Creek, the outlet of the lake, which traverses to the gardens through a culvert under a main thoroughfare. The guidelines were submitted to the landowners and managers and included information on turtle identification, a map of locations of past turtle observations, recommendations for protecting and monitoring known nest sites, and where to report observations. Creation of new safe nesting areas was discussed as an option.

### ***Conclusion and Recommendations***

Management guidelines were developed with the objective of providing land managers with tools to mitigate threats to turtle populations and habitats on their lands using best available information. In 2011, we developed guidelines for managing turtle populations in urban and rural areas; these guidelines complement best management practices developed in 2010 for turtles on forestry lands. Both sets of guidelines are available through HAT's Species at Risk web site ([www.speciesatrisk.hat.bc.ca](http://www.speciesatrisk.hat.bc.ca)). Personalized, site-specific habitat management guidelines were prepared for one large landowner in CRD.

Recommendations for 2012 include the following:

- Continue developing landowner guidelines on HAT's Species at Risk site through additional links to pages with illustrations and examples of recommended actions.
- Improve management guidelines for urban/rural areas and for forestry lands through input from turtle researchers and stewardship groups.
- Follow-up with landowners who have received turtle habitat guidelines from HAT to date and assistance in their implementation on the ground.

## Chapter 6: Outreach and Stewardship

### ***Corresponding Objective***

Objective 6: Conduct outreach and involve private landowners and land managers in stewardship activities.

### ***Description of Activities***

#### Overview of Outreach Activities:

The following summary was provided by Todd Carnahan, Land Care Coordinator for Habitat Acquisition Trust:

In 2011, HAT continued an ongoing outreach campaign to create local awareness of species at risk, to solicit reports from the public, and to help landowners manage for species at risk and their habitats. Land trust staff visited a total of 50 properties where species at risk were known or were suspected to occur. Fifteen properties featured habitat suitable for Western Painted Turtles. Staff confirmed three new occurrences in Metchosin through a direct observation and two photograph-documented reports from landowners. HAT personnel gave 15 public outreach events highlighting turtle conservation, including several presentations to naturalist groups. Outreach and restoration activities pursued by HAT biologists and local volunteers were published in a Capital Regional District Parks newsletter during the turtle nesting season (Appendix 4).

#### Stewardship Activities in CRD and Alberni Valley:

In addition to outreach activities, we collaborated with large landowners and local volunteers at three sites on improving habitat and implementing threat mitigation, as described in Chapter 2, **Nesting Habitat Monitoring and Restoration** (see Appendices 3 and 5). The sites were “Airport Wetlands” in Alberni Valley and Elk/Beaver Lake Regional Park and Swan Lake and Christmas Hill Nature Sanctuary in CRD. In addition to nesting habitat enhancement, these projects involved mitigation of threats. In Alberni Valley, Island Timberlands installed turtle crossing signage on logging roads at strategic locations adjacent to wetlands occupied by turtles and erected barriers and deactivated a spur road to prevent vehicle access to sites used by nesting turtles. In Elk/Beaver Lake Regional Park, CRD Parks installed fencing around nesting areas to curtail disturbance by visitors to nesting turtles and emerging hatchlings. At Swan Lake, Swan Lake and Christmas Hill Nature Sanctuary staff monitored emerged nests and nesting turtles and helped tracking movements of radio-tagged turtles.

### ***Recommendations***

- Continue HAT’s landowner and outreach campaigns to raise awareness of turtles and involve residents in habitat stewardship.

- Continue working with existing habitat stewards, including large landowners and managers who collaborated in habitat enhancement and threat mitigation projects in 2011.

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**Appendix 1. Summary of water bodies surveyed for turtles on Vancouver Island and southern Gulf Islands, 2008 – 2011.**

YES and NO indicate sites where turtles were detected or not detected, respectively.

| Site #  | Location                       | # visits: 2008 | # visits: 2009 | # visits: 2010 | # visits: 2011 | Western Painted Turtle | Red-eared Slider | Comments, including other turtles found                             |
|---|--------------------------------|----------------|----------------|----------------|----------------|------------------------|------------------|---|
| <b>Alberni Valley:</b>                              |                                |                |                |                |                |                        |                  |   |
| 1   | Airport Wetlands               | 2              | 2              | 2              | 4              | YES                    | YES              |   |
| 2   | Ash Main, at 6 km              | 1              |                |                |                | NO                     | NO               |   |
| 3   | Ash Main, Pond 1               |                |                | 1              |                | NO                     | NO               |   |
| 4   | Ashley Lake                    |                |                | 1              |                | NO                     | NO               |   |
| 5   | Beaver Pond W of Turtle Lake   |                |                | 1              |                | NO                     | NO               |   |
| 6   | Boot Lagoon                    |                | 1              |                |                | NO                     | NO               |   |
| 7   | Canal Main, 2 km               | 1              |                |                |                | NO                     | NO               |   |
| 8   | Devil's Den Lake               | 1              | 1              | 1              |                | YES                    | NO               |   |
| 9   | Dickson Lake, SE end           |                |                | 1              |                | NO                     | NO               |   |
| 10  | Great Central Lake             | 1              |                |                |                | NO                     | NO               |   |
| 11  | Little Turtle Lake             | 2              | 1              | 2              |                | YES                    | NO               |   |
| 12  | Lois Lake                      |                |                | 1              |                | NO                     | NO               |   |
| 13  | Loon Lake                      | 1              |                |                |                | NO                     | YES              |   |
| 14  | Lowry Lake                     | 1              |                | 1              |                | NO                     | NO               |   |
| 15  | McKenzie Slough, Stamp River   |                |                |                | 1              | YES                    | NO               |   |
| 16  | McLaughlin Lake                |                |                |                | 1              | NO                     | NO               |   |
| 17  | Moran Lake                     | 1              |                |                |                | NO                     | NO               |   |
| 18  | Patterson Lake                 | 1              | 1              |                |                | YES                    | NO               |   |
| 19  | Sumner Lake                    | 2              | 1              |                |                | NO                     | NO               | Reports of turtles from locals                                      |
| 20  | Turnbull Lake                  |                |                | 1              |                | YES                    | NO               |   |
| 21  | Turtle Lake                    | 2              |                | 1              |                | NO                     | NO               |   |
| 22  | Tyler Rd Pond                  | 1              | 1              |                |                | NO                     | NO               | Snapping Turtle reported by landowner (photo)                       |
| 23  | Wetland west of Turtle Lake    | 1              |                |                |                | NO                     | NO               |   |
| 24  | Winer Wetland, by Sproat Lake  |                |                |                | 1              | NO                     | NO               | Landowner reports turtles   |
| <b>Cowichan Valley &amp; Nanaimo:</b>               |                                |                |                |                |                |                        |                  |   |
| 25  | Kissinger Lake                 | 1              |                |                |                | NO                     | NO               |   |
| 90  | Devereaux Lake                 |                |                | 1              |                | NO                     | NO               |   |
| 31  | Brannen Lake                   |                | 1              |                |                | NO                     | NO               |   |
| 91  | Buttertubs Marsh               | 1              |                |                |                | YES                    | YES              |   |
| 92  | Morrell Lake, Westwood L, Park | 1              |                |                |                | NO                     | NO               |   |
| 93  | Westwood Lake                  | 1              | 1              |                |                | NO                     | YES              |   |
| <b>Capital Regional District, Vancouver Island:</b> |                                |                |                |                |                |                        |                  |   |
| 96  | Adam Kerr Pond                 |                |                | 1              | 2              | YES                    | NO               | Visits in 2011 were in February & part of restoration planning only |
| 26  | Arc Lake                       |                |                |                | 1              | NO                     | NO               |   |

| Site # | Location                                  | # visits: 2008 | # visits: 2009 | # visits: 2010 | # visits: 2011 | Western Painted Turtle | Red-eared Slider | Comments, including other turtles found  |
|--------|---|----------------|----------------|----------------|----------------|------------------------|------------------|--|
| 27     | Elk/Beaver Lake                           | 11             | 5              | 4              | 1              | YES                    | YES              | Survey in 2011 was part of mark-recapture. Numerous additional visits for nest site monitoring. Reeve's Pond Turtle found. |
| 28     | Beckwith Park                             | 2              |                |                |                | NO                     | YES              |  |
| 28     | Fairy Lake                                |                | 1              |                |                | NO                     | NO               |  |
| 29     | Blenkinshop Lake                          | 1              |                |                |                | NO                     | NO               |  |
| 29     | First Lake                                | 1              |                |                |                | NO                     | NO               |  |
| 30     | Blinkhorn Lake                            |                | 1              |                |                | NO                     | NO               |  |
| 30     | Florence Lake                             | 1              |                | 2              | 2              | YES                    | YES              |  |
| 31     | Fork Lake                                 | 2              |                |                |                | NO                     | NO               |  |
| 32     | Cabin Pond Reservoir                      |                |                |                | 1              | NO                     | NO               |  |
| 32     | Frog Lake                                 |                |                |                | 1              | NO                     | NO               |  |
| 33     | Crabapple Lake                            | 1              |                |                |                | NO                     | NO               |  |
| 33     | Glen Lake                                 | 1              |                | 1              | 1              | YES                    | YES              |  |
| 34     | Durrance Lake                             | 9              | 1              |                |                | NO                     | YES              | Eastern Painted Turtle, Cumberland Slider  |
| 34     | Gleren Lake                               |                |                |                | 1              | NO                     | NO               |  |
| 35     | Eagle Lake                                | 1              |                | 1              |                | NO                     | NO               |  |
| 35     | Grass Lake                                | 1              |                | 1              |                | NO                     | NO               |  |
| 37     | Hagan Creek Pond 1                        | 1              |                |                |                | NO                     | NO               | Unidentified turtle seen   |
| 38     | Hovey Rd Pond                             | 1              |                |                |                | NO                     | NO               |  |
| 39     | Hydro Pond, Munn's Rd                     | 1              |                |                |                | NO                     | NO               | Reports of turtles from residents  |
| 40     | Interurban/Wilkinson Wetland              |                |                | 2              |                | NO                     | YES              |  |
| 41     | Jack Lake                                 |                |                |                | 2              | NO                     | NO               |  |
| 42     | Kemp Lake                                 |                | 2              | 1              |                | YES                    | YES              |  |
| 43     | Kettle Pond (just north of Langford Lake) | 1              |                |                |                | NO                     | NO               |  |
| 44     | Killarney Lake                            | 2              |                | 1              |                | NO                     | NO               |  |
| 45     | Kings Pond                                |                |                | 1              |                | NO                     | YES              |  |
| 46     | LaBonne Road Pond                         |                | 1              |                |                | NO                     | NO               |  |
| 47     | Langford Lake                             | 3              | 1              | 1              | 1              | YES                    | YES              |  |
| 48a    | Maltby Lake                               | 1              |                | 1              |                | NO                     | NO               | Landowner showed photo of Western Painted Turtle from the site   |
| 48b    | Little Maltby Lake                        | 1              |                | 2              |                | NO                     | NO               |  |
| 49     | Lizard Lake                               |                | 1              |                |                | NO                     | NO               |  |
| 50     | Lubbe Lake                                |                |                |                | 1              | NO                     | NO               |  |
| 51     | Matheson Lake                             | 2              | 3              | 1              | 1              | YES                    | YES              |  |
| 52     | Matson Lake                               | 1              |                |                |                | NO                     | YES              |  |
| 53     | Mavis Lake                                |                |                |                | 2              | NO                     | NO               |  |



| Site #  | Location                      | # visits: 2008 | # visits: 2009 | # visits: 2010 | # visits: 2011 | Western Painted Turtle | Red-eared Slider | Comments, including other turtles found                                       |
|---|-------------------------------|----------------|----------------|----------------|----------------|------------------------|------------------|---|
| 54  | McKenzie Lake                 | 1              |                | 3              |                | YES                    | YES              | WPT also confirmed by current and previous landowner                          |
| 55  | Mt Mattheson Road, Pond 1     |                | 1              |                |                | NO                     | NO               |   |
| 56  | Munn's Road Pond 1            | 1              |                |                |                | NO                     | NO               |   |
| 57  | Old Wolf Lake                 |                |                |                | 1              | NO                     | NO               |   |
| 60  | Pease Lake                    | 2              | 1              |                | 2              | NO                     | YES              |   |
| 62  | Poirier Lake                  |                | 2              | 1              |                | NO                     | NO               |   |
| 64a   | Sheild Lake                   | 2              |                | 1              |                | NO                     | NO               |   |
| 64b   | Pond btw Shields & Grass Lake | 1              |                |                |                | NO                     | NO               |   |
| 65  | Pond, N of Langford Lake      |                |                |                | 2              | NO                     | NO               |   |
| 67  | Prior Lake                    | 2              |                |                |                | NO                     | NO               | Park visitors reported seeing turtles in the past                             |
| 68  | Prospect Lake                 | 3              |                |                |                | NO                     | YES              |   |
| 69a   | Second Lake                   | 3              |                |                |                | NO                     | NO               |   |
| 70  | Swan Lake                     | 1              |                | 8              | 1              | YES                    | YES              | Numerous additional visits as part of nesting surveys and habitat restoration |
| 71  | Teanook Lake                  | 1              |                |                |                | NO                     | NO               |   |
| 73  | Thetis Lake                   | 2              | 1              | 1              |                | NO                     | YES              | Possible Cooter   |
| 74  | Third Lake                    | 1              |                |                |                | NO                     | NO               |   |
| 76  | Trevlac Pond                  | 1              |                | 2              |                | NO                     | NO               |   |
| 77  | Viaduct Pond                  |                |                | 1              |                | NO                     | NO               |   |
| 78  | Young Lake                    |                | 1              | 1              |                | NO                     | NO               |   |
| 94  | Dimple Lake                   | 1              |                |                |                | NO                     | NO               |   |
| 95  | Pixie Lake                    | 1              | 1              |                |                | NO                     | NO               |   |
| <b>Capital Regional District: Galiano Island</b>  |                               |                |                |                |                |                        |                  |   |
| 72  | Therah ponds                  | 1              |                |                |                | NO                     | NO               |   |
| 81a   | Cook Rd wetland               | 1              |                |                |                | NO                     | NO               |   |
| 81b   | Cook Rd/Ecoreserve 128        | 1              | 2              |                |                | NO                     | NO               |   |
| 83  | Devina Dr. Ponds              | 1              | 1              |                |                | NO                     | NO               |   |
| 84  | Findlay Lake                  | 1              | 1              |                |                | NO                     | NO               |   |
| 86  | Great Beaver Swamp            | 2              | 1              |                |                | NO                     | NO               |   |
| 87  | Laughlin Lake                 | 4              | 2              |                |                | NO                     | YES              |   |
| <b>Capital Regional District: Pender islands:</b> |                               |                |                |                |                |                        |                  |   |
| 36  | Greenburn Lake                |                |                | 1              |                | NO                     | NO               | Eastern Painted Turtle  |
| 58  | Otter Bay Rd Pond 1           | 1              |                |                |                | NO                     | NO               |   |
| 59  | Otter Bay Rd Pond 2           | 1              |                |                |                | NO                     | NO               |   |
| 63  | Pond at Hamilton Beach        | 1              |                |                |                | NO                     | NO               |   |
| 66  | Ponds off Shark Road          | 1              |                |                |                | NO                     | NO               |   |

| Site # | Location           | # visits: 2008 | # visits: 2009 | # visits: 2010 | # visits: 2011 | Western Painted Turtle | Red-eared Slider | Comments, including other turtles found |
|--------|--------------------|----------------|----------------|----------------|----------------|------------------------|------------------|---|
| 75     | Tindle Wood Estate | 1              |                |                |                | NO                     | NO               |   |
| 79     | Buck Lake          | 1              |                |                |                | NO                     | NO               |   |
| 80     | Clam Bay Rd        | 1              |                |                |                | NO                     | NO               |   |
| 82     | Corbett Rd         | 1              |                |                |                | NO                     | YES              |   |
| 85     | Gardom Pond        | 1              |                |                |                | NO                     | NO               |   |
| 88     | Liberto Rd         | 1              |                |                |                | NO                     | YES              |   |
| 89     | Magic Lake         | 2              |                |                |                | NO                     | NO               | Residents report turtles                |

**Appendix 2 . Threat assessment for sites where the Western Painted Turtle was found, 2008 - 2011.**

| Location                                 | Roads - paved | Roads - unpaved | Recr. (motorized) | Recr. (non-motorized) | Pets | Exotic species | Housing/ industrial dev. | Urban activities | Logging | Water use/ control    | Comments  |
|--|---------------|-----------------|-------------------|-----------------------|------|----------------|--------------------------|------------------|---------|-----------------------|---|
| <b><u>Alberni Valley:</u></b>            |               |                 |                   |                       |      |                |                          |                  |         |                       |   |
| Airport wetlands                         | No            | M               | L*                | L*                    | No   | L              | No                       | No               | L       | Beaver weir installed | Predation: disturbed nests & eggs seen. 1 Slider but no bullfrogs encountered   |
| Devil's Den Lake                         | No            | No              | No                | No                    | No   | M              | No                       | No               | L       | No                    | Access limited through overgrown paths & bushwacking. Bullfrogs   |
| Little Turtle Lake                       | No            | L               | No                | L                     | No   | ?              | No                       | No               | L       | No                    | Beaver control in area  |
| McKenzie Slough at Stamp River           | No            | No              | No                | L                     | No   | ?              | No                       | L                | No      | ?                     |   |
| Patterson Lake                           | No            | L               | No                | L                     | No   | ?              | No                       | No               | L       | No                    | Beaver trapping is altering water levels & natural succession. In-growth of vegetation  |
| Turnbull Lake (backwaters)               | No            | H               | No                | L                     | No   | ?              | No                       | No               | L       | No                    | Road grading; road mortality potentially high as a main logging road follows shoreline  |
| <b><u>Capital Regional District:</u></b> |               |                 |                   |                       |      |                |                          |                  |         |                       |   |
| Adam Kerr Park                           | M             | No              | No                | H                     | H    | ?              | No                       | H                | No      | Yes                   | Small urban park  |
| Beaver Lake, Elk/Beaver Lake Park        | L             | L               | L                 | H                     | H    | H              | No                       | L                | No      | Yes                   | Heavily used recreational site for swimming, boating, fishing & dog walking. Bullfrogs and sliders                                  |
| "Beaver Ponds", Elk/Beaver Lake Park     | M             | M               | No                | M^                    | M^   | H              | No                       | L                | No      | No                    | Used for retriever (dog) training and dog walking; potential to disturb nesting turtles high. Road kill hatchling turtles observed. |
| Eagle Lake                               | H             | No              | No                | M                     | ?    | H              | No                       | M                | No      | Yes                   | Small oil spill in pull-out above the lake seen in 2009. WPT known from the vicinity through photos from residents. Bullfrogs       |

| Location      | Roads - paved | Roads - unpaved | Recr. (motorized) | Recr. (non-motorized) | Pets | Exotic species | Housing/ industrial dev. | Urban activities | Logging | Water use/ control | Comments  |
|---------------|---------------|-----------------|-------------------|-----------------------|------|----------------|--------------------------|------------------|---------|--------------------|---|
| Florence Lake | M             | No              | No                | M                     | L    | H              | L                        | M                | No      | ?                  | Pollution run-off possible (septic fields/roads). Sliders and bullfrogs present   |
| Glen Lake     | L             | L               | No                | M                     | M    | H              | L                        | M                | No      |                    | Water main replacement along long section of road adjacent to lake began in spring 2011. Sliders and probably bullfrogs |
| Kemp Lake     | No            | L               | No                | M                     | L    | H              | L                        | L                | No      | Yes                | Community water supply. Sliders present   |
| Langford Lake | M             | No              | L                 | M                     | L    | H              | M                        | M                | No      | Probably           | Residential development ongoing. Mechanical aquatic weed removal; retaining walls along shoreline; bullfrogs & Sliders  |
| Maltby Lake   | M             | L               | No                | L                     | L    | M              | L                        | L                | No      | ?                  | Western Painted Turtle known from photos from resident. Bullfrogs & pumpkin fish present.                               |
| Matheson Lake | L             | No              | No                | M                     | M    | H              | No                       | No               | No      | ?                  | Nesting ground on island is a heavily used recreational day use area with boat access only. Sliders present.            |
| McKenzie Lake | L             | L               | No                | M                     | L    | ?              | L                        | L                | No      |                    | Partially park; partially private residential   |
| Swan Lake     | M             | L               | No                | L                     | No   | H              | No                       | M                | No      |                    | High blue-green algae blooms occasionally. Bullfrogs and Sliders  |

\*Threat rating reduced from "High" due to mitigation. Threats from vehicular traffic & ATVs mitigated on nesting grounds in 2011 by road deactivation & barriers.

^Threats from pets and visitors mitigated through the installation of fence at communal breeding sites.

**Appendix 3. Pictorial document of turtle nesting habitat enhancement activities in Elk/Beaver Lake Regional Park in 2011.**



Multi-use areas southwest of Beaver Lake contain important nesting habitat for the endangered Pacific Coast Population of the Western Painted Turtle. On 2 June 2011, in collaboration with CRD Parks, Elk-Beaver Lake Equestrian Society (EBES), and volunteers from Starbucks and CRD Parks, Habitat Acquisition Trust (HAT) biologists Christian Engelstoft and Kristiina Ovaska engaged in nesting habitat enhancement at two sites.



One enhancement site was within the EBES riding ring area, where turtles have been nesting on paths and other unsafe areas. This site next to a horse exercise ring was selected because of known previous use by turtles.



First, the ground was cleared of weeds, and piles of sand and soil were brought in, courtesy of CRD Parks. EBES donated a pile of sand already present at the site.



The substrate was deposited along two east-west oriented rows, gently sloping to the south to provide warm nesting sites for turtles.



Two types of substrates were used to examine preferences by turtles: sand and a mixture of 60% sand/40% soil. The two substrates were deposited along the ridges within alternating 1 x 1 m grids.



Many wheelbarrow loads of sand and soil were moved to provide sufficient depth (20 cm or more) to the nesting areas.



Starting the second ridge.



Compacting the substrate.





The finished product with a snake fence to prevent inadvertent disturbance by the public.



Well-deserved lunch generously provided by CRD Parks with coffee from Starbucks! Additional volunteers joined in after lunch.



The other nesting habitat enhancement site was by a small pond in an area co-managed by CRD Parks and Vancouver Island Retriever Club, who originally dug the pond about 30 years ago. Turtles come here from the lake and communally nest within a small area next to the pond. The site is getting overgrown with grass and weeds.



In 2010, we experimentally weeded and turned over four 1 m<sup>2</sup> plots within this area, and turtles preferentially nested in these bare patches.



This year, with help from hard-working volunteers, we similarly weeded and turned over four additional plots that had served as control plots last year but were not used by nesting turtles.



Starbucks volunteer Christina getting her hands dirty!



A big “thank you” to all volunteers who came out to help! Support from CRD Regional Parks, Elk-Beaver Lake Equestrian Society, Vancouver Island Retriever Club, and volunteers from Starbucks and CRD Parks made this project possible. Colleen Lang (CRD Parks volunteer coordinator) and Wendy Weldring (Starbucks Store Manager) both did a fabulous job organizing volunteers.

Appendix 4. Article about HAT's turtle habitat enhancement project in Capital Regional District Newsletter (summer 2011).



# Turf for Turtles

## Turtle Nesting Habitat Enhancement in Elk/Beaver Lake Regional Park

By Christian Engelstoft and Kristina Ovsaka

Multi-use areas southwest of Beaver Lake contain important nesting habitat for the endangered Pacific Coast population of the Western Painted Turtle.

On June 2, 2011, staff and volunteers from CRD Regional Parks, Elk/Beaver Lake Equestrian Society (EBES), Habitat Acquisition Trust (HAT), along with volunteers from Starbucks, engaged in nesting habitat enhancement at two sites.

One enhancement site was within the EBES riding ring area, where turtles have been nesting on paths and other unsafe areas. This site next to a horse exercise ring was selected because of known previous use by turtles.

First, the ground was cleared of weeds, and piles of sand and soil were brought in, courtesy of CRD Regional Parks. EBES donated a pile of sand already present at the site. The substrate was deposited along two east-west oriented rows, gently sloping to the south to provide warm nesting sites for turtles.

Two types of substrates were used to examine preferences by turtles: sand and a mixture of 60% sand/40% soil. The two substrates were deposited along the ridges within alternating 1x1 m grids. Many wheelbarrow loads of sand and soil were moved to provide sufficient depth (20 cm or more) to the nesting areas.

The other nesting habitat enhancement site was by a small pond in an area co-managed by CRD Regional Parks and Vancouver Island Retriever Club, who originally dug the pond about 30 years ago. Turtles come here from the lake and communally nest within a small area next to the pond. The site is getting overgrown with grass and weeds.

In 2010, we experimentally weeded and turned over four 1 m<sup>2</sup> plots within this area, and turtles preferentially nested in these bare patches. This year, with help from hard-working volunteers, we similarly weeded and turned over four additional plots that had served as control plots last year but were not used by nesting turtles.

A big "thank you" to all volunteers who came out to help! Biologists Christian Engelstoft and Kristina Ovsaka are with Habitat Acquisition Trust.



Volunteers prepared the sites



Volunteers weeded and turned over plots



Volunteers at a well-deserved lunch

**Appendix 5. Pictorial document of turtle nesting habitat enhancement activities in Alberni Valley in May 2011.**



The endangered Western Painted Turtle occupies forestry lands in the Alberni Valley, where suitable nesting areas appear to be in short supply. On 27 May 2011, in collaboration with Island Timberlands and volunteers from Alberni Valley Enhancement Society (AVES), Habitat Acquisition Trust (HAT) biologists Christian Engelstoft and Kristiina Ovaska engaged in nesting habitat enhancement at an old gravel pit where turtles have been observed nesting in previous years.



The site is approximately 50 m from a wetland. Numerous nesting attempts have been observed here from 2008 – 2010, including a few nests with emerged hatchlings, but the hard-packed ground and coarse gravel substrate appear to hinder successful nesting.



The site had been used for unauthorized dumping and target practice; the first task was to clear the site from accumulated garbage.



Heavy machinery arrived to prepare the ground, courtesy of Island Timberlands.



Sand was brought in and deposited along two ridges aligned east to west to provide a warm, south-facing nesting area for turtles.



The ridges were shaped to create a gentle slope on the south-facing side.





Raking the slope; Island Timberlands personnel inspecting the work.



Walking on the ridges to compact the sand.



Creating a barrier of boulders to prevent unauthorized vehicle access to the site.



More boulders are needed!



Finished project – ready for nesting turtles.



Deactivated spur road leading to the site.



Island Timberlands has installed turtle crossing signs at strategic points along the logging road passing wetlands to alert drivers to the possible presence of migrating turtles on roads.



The restored nesting site will be monitored for use by turtles. Turtle tracks were noted on the new ridges shortly after the enhancement was completed.

Rick Avis



This project was made possible by support from Island Timberlands who allowed us to work on their lands and who provided materials, heavy machinery, and personnel for the project. Help of volunteers from Alberni Valley Enhancement Society, Libby and Rick Avis in particular, was much appreciated. Funding for the project came from Habitat Stewardship Program grant to Habitat Acquisition Trust.