

**Status and Distribution of Native Turtles in the Columbia Slough and  
Johnson Creek Watersheds: Results of 2009 Surveys**



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**Report from:**

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**Report to:**

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**Executive Summary:**

During the summer of 2009, selected sites within the Columbia Slough and Johnson Creek watersheds were surveyed for western painted (*Chrysemys picta bellii*) and western pond (*Clemmys [Actinemys] marmorata*) turtles, the two species native to Oregon. Surveys were performed by wildlife biologists sub-contracting to the Northwest Ecological Research Institute. Sites were assessed for the presence of turtles, quality of habitat present, and potential for habitat restoration, with respect to the requirements of native turtle species. In general, both watersheds were extremely degraded, and most sites were too heavily developed to support reproducing populations of native turtles without heroic efforts at habitat restoration. Of the two watersheds, the Columbia Slough had more suitable habitat, and existing populations of western painted turtles were found at four sites within the watershed: Winmar Wetlands, Ramsey Stormwater Wetlands, the Heron Lakes Golf Course and the Whitaker Ponds/Whitaker Slough complex. Of these sites, Winmar and Ramsey currently support sustaining populations of painted turtles, while the Whitaker Ponds and Slough support a population of painted turtles which is probably declining, but may be increased through habitat restoration. The painted turtle population on the Heron Lakes Golf Course also appears to be declining, though management options are limited. No extant populations of native turtles were found within the Johnson Creek watershed.

## I. Introduction: *The Western Painted Turtle*

Given the nature of this report, it may be profitable to briefly describe the natural history of the subject involved, in order to promote a better understanding of its habitat requirements as pertains to restoration recommendations. The following is a brief account of the natural history of the painted turtle, including those aspects most important to the current study. Owing to the general absence of the pond turtle from the study area, it is not discussed here.

The painted turtles, genus *Chrysemys*, are a group of four species native to North America, where they occur from coast to coast. The largest of the four species, and the one with the largest geographic range, is the western painted turtle, *Chrysemys picta bellii*. In the United States, this turtle occurs from the Great Lakes region south into Missouri, across much of the Plains states and through Idaho into Washington and Oregon. This species is a geologically recent invader of the Pacific Northwest, having moved up the Snake and down the Columbia drainages (and tributaries) coastward. At the time of European settlement, this turtle had entered the Willamette drainage and colonized waters at least as far south as Corvallis. At the time of this writing, the western painted turtle has been introduced to the Rogue basin and is reproducing, though its exact status is unknown. Within the Columbia mainstem, this turtle occurs with some frequency west to about Brownsmead. It is also present in some of Oregon's north coastal basins.

Though it may be found in a variety of situations, the preferred habitat of the western painted turtle is still or slow-moving permanent water with a muddy bottom and abundant aquatic vegetation. In Oregon, this species occurs primarily in rivers, ponds, and bottomland sloughs. Adult turtles are generally active from March through October, and spend most of their time in water, though they will haul out on logs or other objects with good sun exposure and bask for long periods of time. Basking is used to raise the turtle's body temperature to that required for essential physiological processes, such as digestion, and also allows the turtle to manufacture vitamin D<sub>3</sub>, which is required for proper absorption of calcium from food. (This latter aspect is particularly necessary when a turtle's diet is predominantly vegetarian in nature.) Basking is performed most extensively in spring, when waters are cool, and is reduced during the summer, when waters are warmer. A lesser peak occurs again in fall, prior to the onset of hibernation. During the winter, painted turtles hibernate at the bottom of a body of water. This inactivity during the winter period is not true hibernation, as occurs in bears, but rather a torpid state, in which physiological processes are slowed as a result of low water temperature. During this time, turtles do not readily surface to breathe, but rather absorb dissolved oxygen directly from the water via the linings of their throat and cloaca (vent). They can apparently distinguish differences in oxygen concentrations, and may move slowly under water, or even under ice, to the areas where dissolved oxygen is greatest, such as creek or spring inflows, or shallow areas where they are closer to surface gas exchange.

Painted turtles reproduce by means of leathery-shelled eggs, which are laid on land in a flask-shaped nest dug by the female turtle. Nesting of painted turtles occurs from May through July in western Oregon. Nests are typically placed in an open, sunny area, located from two meters to several hundred meters from the waters' edge.

Turtles generally lay from five to fifteen eggs, with larger females typically laying more (and slightly larger) eggs. Female turtles may nest from one to three times per season, depending on their physical condition (ultimately, a factor determined by the quality of available habitat). Ideal nesting habitat consists of bare, well-drained soil, but nests may be made in gravel, sand, or even clay. To develop successfully, painted turtle eggs require exposure to full sun for most of the day, for at least two months. Because of this requirement, lack of suitable nesting habitat is often a factor limiting the size of painted turtle populations. The historic seasonal fluctuation of the Columbia and Willamette rivers likely created much nesting habitat in the form of sand and gravel bars continually disturbed and re-deposited by high water. Hatchling turtles may emerge from the nest either in the fall of the year they were laid as eggs, or may spend the winter in the nest and emerge the following spring. The percent of a population's hatchlings which take a given course appears to vary by site, and may depend on the date on which the eggs were laid, among other things.

Young painted turtles (animals less than approximately 100 mm in carapace length) typically occupy habitats different than those used by adults. In particular, young animals prefer shallow, heavily vegetated portions of water bodies, and are frequently found near shore. Young turtles haul out on logs much less than adults, preferring the safety of heavy cover. Thick mats of algae and duckweed are often used by small turtles, who will spend much of the day resting and feeding in the warm surface waters trapped by the plant matter. Painted turtles are an omnivorous species, though existing data suggest that juvenile turtles are much more carnivorous than adults. The former take mostly animal matter, including snails, small tadpoles, and aquatic insects, whereas adult turtles eat primarily plant matter, though often with invertebrates (which were hiding in the plants) mixed in. In western Oregon, native *Elodea* is a favored item of diet, and one study found primarily blue-green algae in the stomachs of painted turtles from Smith and Bybee Lakes.

Readers interested in further details of the painted turtle's life history are recommended first to the excellent work of Carr (1952), then to that of Ernst and Barbour (1989; though an updated, second edition is now available). Material on painted turtles in Oregon is mostly unpublished, though some information is given in Nussbaum *et al.* (1983), St. John (2002), and a brief account is provided in Stebbins (2003). The most detailed information available on an Oregon painted turtle population is that reported by Hayes (1999). Hayes' data are especially applicable to the current study, as they refer to turtles within the Columbia Slough metapopulation complex discussed here. In addition, his thorough review of the available literature contains an excellent list of references.

In summary, the basic habitat requirements of the western painted turtle are: still, heavily vegetated permanent water bodies with little shade. The existence of shallow waters with extensive plant growth are needed for young turtles. Successful reproduction requires the presence of accessible nesting areas which are well-drained and sunny. Generally, areas with frequent or dramatic fluctuations in water level, and areas with high densities of development or roads surrounding turtle-inhabited water bodies, are unlikely to successfully sustain populations of painted turtles over the long term.



## II. Survey Description

### Description:

From 12 June to 30 August 2009, surveys for the western painted turtle, *Chrysemys picta belli*; and western pond turtle, *Clemmys* [*Actinemys*] *marmorata*, were conducted at selected sites (see below) as per discussion with City of Portland Bureau of Environmental Services (20 May 2009). Surveys followed standard visual and live trap survey methods for turtles (see Carr 1952) that were modified for species native to Oregon; (Holland 1991, Hayes 1999, Beilke 2007). The protocol developed by ODFW and NERI biologists in 2007 (Beilke 2007) was established in order to have a standardized method that could be used in the field to determine turtle occupancy (presence/absence) of sites. The protocol was modeled in part after that developed by the Interagency Western Pond Turtle Working Group in Oregon, 2001, as part of the Survey and Monitoring Plan for the Western Pond Turtle Conservation Strategy; (Bury 2001). Protocol guidelines include when to survey (e.g., weather conditions, time of year) and how to conduct the survey. Survey methods for this project included both walking and kayaking of sites depending on the terrain and accessibility.

Methods used to capture turtles included live trapping and by hand; both methods were used at the Winmar site. The hand capture method was used at the Ramsey and Heron Lakes sites.

A habitat assessment was also conducted for each site. Sites were examined with respect to habitat quality, quantity (e.g., basking logs), and the capacity to support turtles. This latter category included, among other things, assessment of such factors as type and level of site use by humans and other turtle predators, type and proximity of development, and site age, origin, and hydrology.

Section V gives detailed accounts of each site surveyed which includes all of the information gathered as part of the habitat assessment. Specific recommendations for habitat restoration/enhancement are also included, with general recommendations included in Section IV.

The sites listed below were surveyed for the presence of turtles in 2009. Due to time and funding constraints, not all of the sites on the City of Portland list were surveyed.

Columbia Slough: The sites in the Columbia Slough watershed were surveyed by Chris Rombough, with the exception of the Inverness, Ramsey and Winmar sites. The Inverness site was surveyed independently by Chris Rombough and Linda McGinnis, the Ramsey site was surveyed by Chris Rombough and Sue Beilke, and the Winmar site was surveyed by Sue Beilke, Linda McGinnis, and Chris Rombough simultaneously. The following Columbia Slough sites were surveyed:

1. Winmar Wetlands
2. Inverness Wetlands
3. Johnson Lake
4. Colwood Golf Course
5. Whitaker Ponds
6. Whitaker Slough
7. Bridgeton Slough

8. Heron Lakes Golf Course
9. Ramsey Stormwater Wetlands and Salmon Refugia
10. Columbia Slough Confluence

Johnson Creek: The following sites in the Johnson Creek watershed were surveyed by Linda McGinnis:

1. Eastmoreland Golf Course
2. Crystal Springs
3. Reed Canyon
4. Lents Crossing II
5. Brookside Park
6. Beggar's Tick Marsh
7. Zenger Farms
8. Kelley Creek
9. Kelley Creek/Johnson Creek Confluence

### **III. Results/Discussion**

#### **Summary:**

##### Columbia Slough:

The survey sites for this project consisted of selected portions of the Columbia Slough and a number of connected (e.g., Whitaker Slough) and disconnected (e.g., Whitaker Ponds, Johnson Lake) aquatic features. Visual surveys detected western painted turtles at 4 of the ten sites surveyed on the Columbia Slough. Both adult and juvenile western painted turtles were detected at the Winmar, Heron Lakes and Ramsey sites, while only adults were detected at Whitaker Ponds. Painted turtles have historically been observed at Heron Lakes, Ramsey Stormwater Ponds, Whitaker Ponds and Bridgeton Slough.

Non-native red-eared slider turtles were observed at the Winmar and Ramsey sites, most likely the result of released pet turtles over a number of years. Of note is that this non-native species is successfully reproducing on the Ramsey site; nests as well as juvenile sliders were observed during the survey. The non-native slider has been observed historically at this site since approximately 1999, when NERI conducted turtle surveys of this area. Dumping of pet turtles is a common and serious problem in many of the urban wetlands within the Portland metropolitan region.

Both adult and juvenile painted turtles were captured at the Winmar and Heron Lakes sites with data taken on gender, age, body mass, carapace and plastron length, as well as noting overall health of the turtle. Turtles were immediately released after data was obtained.

Juvenile painted turtles observed at the Winmar site and nearby pond were utilizing aquatic habitat that offered excellent vegetative cover and food for small turtles. This is one of the most important factors for juvenile turtle survival and which has been noted as severely lacking on many sites in the Portland region during previous surveys for painted turtles conducted by NERI.

Across the survey area, the Columbia Slough serves as a movement corridor for a metapopulation of western painted turtles occupying heavily developed and highly fragmented habitat. Of this inhabited area, localized patches of higher quality habitat provide opportunities for painted turtle reproduction and recruitment (Winmar, Ramsey and Heron Lakes), while other sites are of low quality and are useful to turtles only as movement corridors that allow the turtles to travel between sites without having to cross as many roads. Overall, the primary value of the Columbia Slough within the survey area is as a corridor connecting areas of suitable habitat.

Of the sites surveyed, the best were the Winmar Wetlands, the Ramsey Stormwater Wetlands, and the combined Whitaker Ponds and Whitaker Slough (from the ponds downstream to the confluence). The Winmar and Ramsey sites are superior to the others surveyed, in quality and composition of habitat as well as their degree of connectivity. Both are physically connected to habitat with existing painted turtle populations, and both have been recently colonized (<30 years) by turtles. Sufficient nesting and aquatic habitat occurs at both sites to support self-sustaining painted turtle populations. The Whitaker Ponds/Whitaker Slough complex is an interesting case. Despite the fact that the ponds are almost completely isolated by development, their connection to the slough has allowed painted turtles to persist in this area. It is almost certain that the persistence of turtles in this area is due to the turtles' ability to move between the ponds and the slough. Although this population is most likely declining, the opportunity currently exists to perform habitat restoration (construction of a nesting site) necessary for the turtles' continued survival. Therefore, because it has potential for improvement, this site is considered good.

In contrast, the Heron Lakes Golf Course is considered to be a relatively poor site, despite the fact that it currently harbors painted turtles. Though turtles currently exist in aquatic features both on and around the golf course (water hazards, Force Lake, etc.), this occurrence probably reflects the proximity of these features to currently (e.g., the Columbia Slough) and historically occupied habitat more than it does the site's actual quality. In truth, though its location allows painted turtles to occur there, the value of the Heron Lakes Golf Course to painted turtles is rather low. Since, given the nature of the site, there are few options to improve the habitat for turtles, this site is considered poor. Because this declaration may seem perhaps unjustified, it may be appropriate to provide a quick note on golf courses. Generally, golf courses provide poor habitat for painted turtles, for several reasons:

1. Aquatic habitats on courses are generally small and very simple, having little cover and providing little in the way of a suitable food supply. In addition, they are often the endpoint for runoff heavy in fertilizers and herbicides.
2. Golf courses receive, as is their goal, high levels of human use, resulting in continuous disturbance to any turtles present.
3. The land portion of most golf courses is usually heavily managed, frequently mowed, and heavily fertilized, leaving turtles without vegetative cover or suitable areas to nest. Though turtles frequently do nest on golf courses, these nests are typically placed either in the greens or in sand traps. In the greens, nests usually fail due to frequent watering (causing bacterial or fungal growth and subsequent death of the eggs) and/or ingrowth of grass roots (trapping the hatchlings in the nest). In sand traps, eggs are usually crushed during

maintenance or play. The net result is that golf courses serve as a population 'sink' in most circumstances, frequently enticing turtles to nest in areas where their nests will fail.

For these reasons, and because management for turtles typically runs contrary to that needed to maintain operational golf courses, few recommendations in this area can be made. In general, turtles are best encouraged to avoid golf courses. That said, if use of golf courses is occurring, or is desired, heavily vegetating the banks of water features with shrubs of medium height (in Oregon, good native species are salal, Spiraea, and creek or red-osier dogwood), will help reduce visibility and level of disturbance to the turtles, while still maintaining an attractive appearance to the landscape.

The remaining Columbia Slough sites surveyed varied in quality. Most were generally poor habitat with respect to sustaining turtle populations. Some may be quite valuable as aquatic corridors for turtle movement, though attempting to determine whether or not this was the case was beyond the scope of this survey (see Section V for further information on each site).

#### Johnson Creek:

In general, the portion of the Johnson Creek watershed surveyed was too heavily degraded and isolated to sustain any painted turtle population. Portions of the creek appear to be too shallow (<2 feet) to support turtles year-round and in addition, some areas have steep (e.g., rock) walls that would prevent turtles from moving in and out of the creek. No native turtles were observed at any of the sites surveyed; a turtle (not identified to species), was observed with two red-eared sliders at the Reed Canyon site. The latter were most likely released pet turtles. Historically, western painted turtles were observed at both the East Moreland Golf Course and Crystal Springs sites (Beilke, pers. comm.). Anecdotal sightings of painted turtles also exist for several other areas along Johnson creek but these have not been verified. Disturbance from humans as well as pets (dogs) was noted at many of the sites, in particular at parks. A high and persistent level of disturbance over time can be an important factor in preventing turtles from using a particular area.

Most sites surveyed along Johnson Creek lacked suitable active-season and/or nesting habitat. In addition, most sites were completely surrounded by development, effectively isolating them and preventing any colonization by native turtles. Suitable upland habitat for nesting was consistently absent on most of the sites. Of the sites surveyed, those offering some suitable turtle habitat (e.g., basking logs, permanent aquatic habitat) were Lents Crossing II, Brookside Park, Zenger Farms, Reed Canyon and Beggar's Tick Marsh. Though native turtles were not found at any of these sites, they possessed one or more habitat features necessary for at least part of a painted turtle's life cycle.

Many of the sites surveyed would benefit from habitat enhancement including placement of logs, etc. Backwater sloughs and ponds have been severely impacted in urban areas, and as noted during the 2009 surveys, several sites (e.g, Zenger Wetland) may offer the potential for future creation of these types of habitats for turtles and other wildlife. Even if turtles do not use a particular area, enhancement activities will benefit many other wildlife species in Johnson Creek. Further site-specific recommendations can be found in Section V.

## IV. GENERAL RECOMMENDATIONS

Information from the 2009 surveys has helped to contribute to the knowledge and understanding of native turtle presence and habitat use for both the Columbia Slough and Johnson Creek sites. This knowledge will also help to fill in some of the data gaps addressed in the Oregon Conservation Strategy, which identifies guidelines and priorities for species and habitat conservation in Oregon. In addition to recommendations made in this report for specific sites (see Section V), NERI recommends the following general recommendations be considered by the City of Portland in regard to future management of habitat and turtle populations.

- Knowledge from the 2009 survey effort has contributed to the understanding of turtle distribution and habitat use within the City of Portland. We recommend establishing a long-term survey and monitoring effort in order to adequately assess habitat restoration efforts and turtle use of those habitats on various sites. This will allow for successful adaptive management of turtle habitats for the long term.
- Continue to survey for turtles both visually and through trapping (mark/recapture) efforts. Data is severely lacking for most Portland sites including information on population demographics, movement and dispersal, and nesting success. Long-term studies are important for providing this crucial information for the conservation of native turtles.
- Nest surveys are an important aspect of monitoring turtle use of a particular site and to help determine reproductive activity. We recommend conducting nest searches in areas where turtles occur, including estimating number of successful nests versus number of predated nests. Nesting habitat is crucial for the long term survival of turtle populations and should be located in quiet, undisturbed areas.
- NERI recommends conducting trapping and removal of all non-native turtles from sites where they occur, in order to reduce competition and the threat of diseases non-native turtles pose to native turtle populations. Public outreach/education is also crucial in educating citizens of the importance of not releasing non-native turtles into local habitats, etc.
- Removal/selective thinning of trees is recommended near nesting areas in order to reduce shade or the potential for trees to shade out important nesting areas.
- Reducing human disturbance at sites with turtles is important in order to provide habitats that offer high quality basking and nesting areas. This is especially important near nesting habitats since female turtles need nesting areas with no or low disturbance levels. Frequent disturbances will cause females to abandon nest sites and may cause them to move to a new area altogether, which may also put them at greater risk by crossing roads.

## V. Sites Surveyed/Site Recommendations

Note: The following abbreviations are used throughout this portion of the report:

*FL = fork length.* A measurement used to report the length of a fish. Fork length is the distance from the fish's snout to the center of the fork in the fish's tail.

*SVL = snout-vent length.* A standard measurement of reptiles and amphibians, this is the distance between the tip of an animal's snout and its vent, or cloaca.

*TL = total length.* The distance between the tip of an animal's snout (or the anterior-most point of its body for invertebrates), and the tip of its tail.

*CL = carapace length.* The length of a turtle's top shell, in a straight line.

### Columbia Slough

**Site:** Winmar Wetlands

**Survey Date and Time:** 29 June 2009, 1240-1400. 22 July 2009, 0730-1530.

**Survey Conditions:** 29 June 2009: 10% cloud cover, still (wind = Beaufort 0-1), mean air temperature of 76°F. 22 July 2009: 100% cloud cover, still (wind = Beaufort 0), air temperature = 61.1°F at start; 0% cloud cover, light breeze (Beaufort 1), air temperature = 85.6 °F at end.

#### **Selected Notes:**

29 June 2009: Surveyed canal/ditch connected to Columbia Slough via kayak with Sue and Linda; also surveyed Columbia Slough to ca. 800m upstream of 185<sup>th</sup> Avenue crossing. Surveyed shoreline of small ponds in northwest corner by walking/wading. Bullfrog (*Rana catesbeiana*) males calling sporadically along Slough; one bullfrog egg mass observed in Slough near 185<sup>th</sup> crossing. Large, overwintered bullfrog larvae abundant in Slough and connector channel. Schools of 10-20+ carp (*Cyprinus carpio*; 10-15 inches FL) very abundant throughout connector channel and slough; most of connector channel devoid of vegetation.

Schools of small threespine stickleback (*Gasterosteus aculeatus*; 50-200 fish) and a single prickly sculpin (*Cottus asper*) observed in cool stream flowing east along south edge of ponds. Single turtle observed during visit was a female red-eared slider (*Trachemys scripta elegans*), ca. 205mm CL, basking on a floating log in the connector channel.

22 July 2009: Surveyed and trapped storm water pond south of pump building. Around pond, found 31 recent (< 2 months) painted turtle nest attempts, all in the gravel road bordering the pond. Two of these were at the east end of the pond, and at least one of these was successful (contained eggs), though the turtle had not finished covering it, and only a small amount of soil was placed atop the eggs. Possibly, the turtle had been scared off by a predator or human before covering the nest. Twenty-nine nest attempts were

found in the gravel road around the west end of the pond; approximately 11 of these appeared to have been completed successfully, though they were not excavated to check.

Two painted turtle nest attempts found in south-facing, sandy road bank at west side of bridge over connector slough; 1 appears to have been successful. Eight turtle nest attempts found in gravel road and landing around ponds on north side of Airport Way. Two of these (one finished and one unfinished nest) appear to have been made by a red-eared slider; the rest are painted turtle nests. Adult bullfrogs calling from most of Winmar ponds; adult and juvenile bullfrogs observed at surface in all of Winmar ponds; large (second-year) bullfrog larvae surfacing in all of the ponds. 10:30- Sue Beilke arrived, and we trapped pond south of pump building and two largest Winmar ponds. Traps not successful; hand-captured a juvenile painted turtle in pond south of pump building and two adult painted turtles in the westernmost of the two large ponds. Large carp (24-28 inches FL) actively feeding in connector slough; several large mussel (*Anodonta* spp.) shells found on slough bank near culvert, the result of otter (*Lontra canadensis*) predation. Remains of a large, freshly killed (< 3 hours old) carp (also the result of otter predation) on the bank of the slough here, as well.



Painted turtle nest at east side of pond south of pump station.

*Turtles observed:* This visit, saw three adult (ca. 160-180 mm CL) and at least four juvenile (ca. 75-130 mm CL) painted turtles in pond south of pump station; captured one, a juvenile (55.0 mm CL, 24.0 g). Saw seven adult painted turtles (ca. 165-180+ mm CL) in the westernmost of the two large ponds at Winmar; captured two, an adult male (170.0 mm CL, 584.0 g) and an adult female (140.0 mm CL, 404.0 g). Saw one small adult (ca. 155 mm CL) painted turtle in one of the small northwest corner ponds.

As described above, found 31 painted turtle nest attempts in the gravel road surrounding the ponds south of the pump station; found two nest attempts in the road bank at the south side of the bridge crossing over the connector canal; and finally, found eight turtle nest attempts in the gravel road surrounding the ponds north of Airport Way, two of which were probably made by a slider turtle.

The Winmar site was surveyed independently by Linda McGinnis on 23 June 2009, from 1300-1415, under weather conditions of high, partial cloud cover, low wind, and an air temperature of 86 F. Linda did not observe any turtles on this (23 June) visit.

**Comments:** Winmar was unquestionably the best site surveyed. Among all survey sites, portions of this site provide the most high-quality habitat and supports the largest population of western painted turtles found during surveys (though an accurate census of population size was not made during this survey). Although most of the ponds here were created recently ( $\leq 30$  years ago; D. Helzer, *pers. comm.*), the proximity of these ponds to existing painted turtle populations (e.g., in the pond south of the pump building), as well as the Columbia Slough, has allowed turtles to colonize the site.

With respect to painted turtles, the most important feature of the site is the presence of numerous freshwater ponds which lack surface-water connections to the

Columbia Slough, shielding them from the rapid fluctuations in water level which occur in the Slough and connected channels. In addition to moderating the site's hydrology, the isolated nature of the ponds reduces access by large carp, which consume most species of aquatic vegetation and, as a result, have removed most of the cover and food (both vegetative and invertebrate) required to support turtles over much of the Slough. The ponds at Winmar thus support a number of aquatic plant, invertebrate, and vertebrate species preferred by painted turtles as food. Additionally, these ponds provide excellent vegetative cover in the form of thick beds of native *Elodea*.

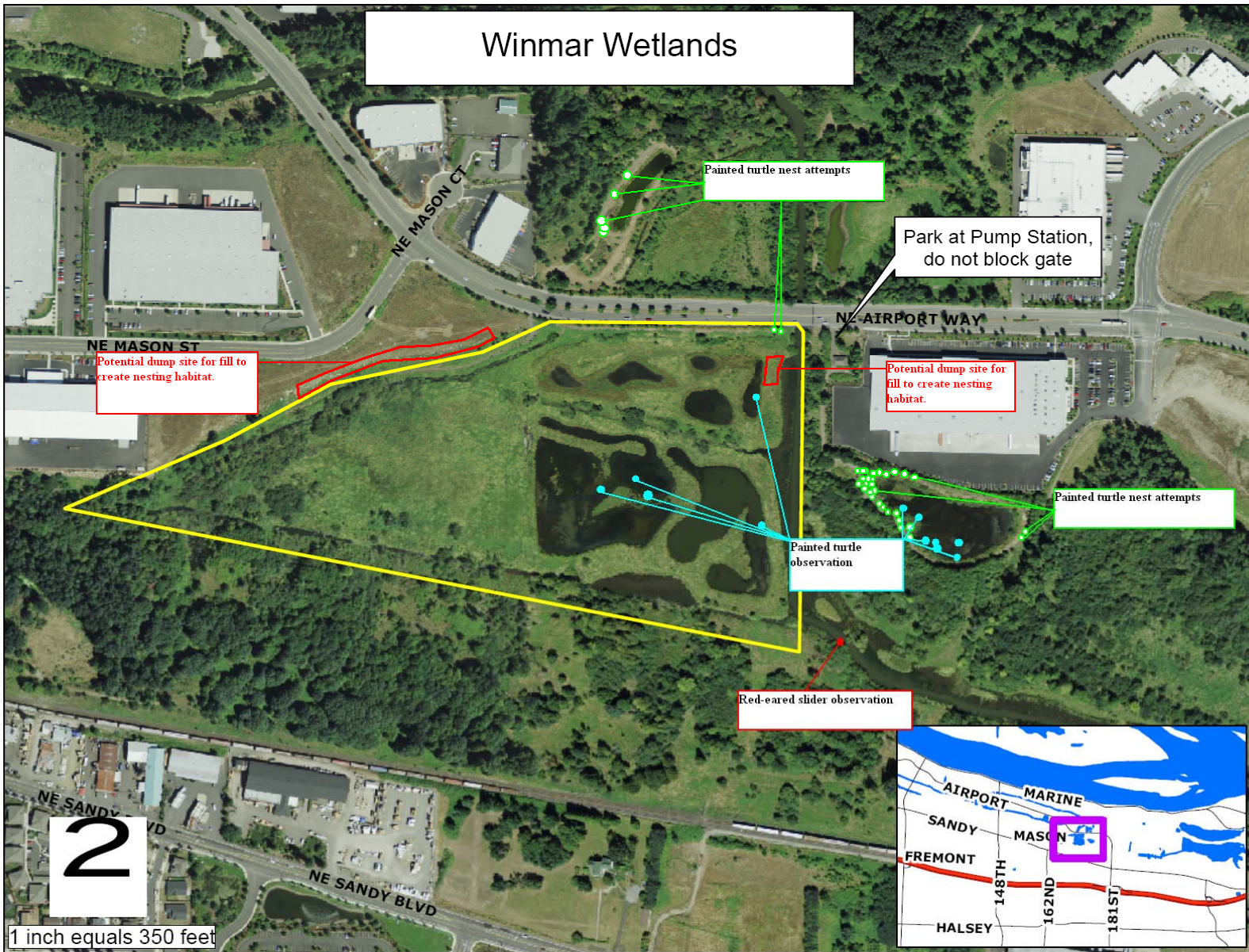
A second, highly valuable feature of the site is the presence of aquatic connections between ponds on either side of Airport Way (e.g., the open culvert and connector slough), allowing turtles to move freely between these areas without having to cross Airport Way.

**Recommendations:** Habitat recommendations for this site, as discussed with the staff of the City of Portland's Bureau of Environmental Services, consist of the following suggestions, with respect to the planned construction of additional pond area:

1. Avoid breaching the dike between the slough and the existing large ponds. Breaching this dike will subject the ponds to the dramatic hydrologic fluctuation currently existing in the slough. It will also allow large carp to access the ponds, where they will eliminate the vegetative and invertebrate communities that are currently supporting the painted turtles in this portion of the site.
2. Ensure that sufficient nesting area is available for turtles present at the site. This can be done by dumping fill at the location specified on the map (below), or by creating a nesting site elsewhere at Winmar via fill dumping or scraping vegetation off of a south-facing bank, as currently exists along the west border of the site. When selecting a nesting site, care should be taken to ensure that the site is easily accessible from the ponds, south-facing and fairly well exposed, and high enough that it does not become inundated during high water. Ideally, the site would be located in an area where it cannot be easily accessed by people or dogs, though keeping it from other predators (rats, raccoons, etc.), may be difficult. One potential option consists of dumping fill (20-30 cubic yards or more would be ideal) along the gravel road currently bordering the west/northwest corner of the site, when pond construction is complete. Vegetating the bank along Airport Way, as is currently being done, is beneficial, as it will discourage turtles from attempting to nest along the road, where turtles and their nests will be vulnerable to traffic and predators.
3. Install basking structure in ponds wherever possible. Logs, platforms and the like can be placed in the center of ponds to provide basking habitat for adult turtles; logs, stumps, and root wads placed at the edges of ponds will provide habitat for juvenile turtles, as well as amphibians and other species of wildlife, including juvenile salmonids during high water. It is understood, as per discussion with City engineers, that structure must be anchored or partially buried to prevent its floating into the drainage canal during high water. Any similar means of fixing structure in place will work, as long as a portion of the structure remains out of water from March-October, so that it is available to turtles.



In addition to the above suggestions for improving painted turtle habitat, NERI recommends conducting mark-recapture surveys at the Winmar site in order to better understand the demography of this population and determine whether Winmar turtles are successfully recruiting. A baseline estimate of population size prior to further restoration efforts will aid in determining whether those efforts are ultimately successful at increasing the Winmar turtle population. Although three turtles were captured and marked in 2009, conducting a detailed estimate of the Winmar population was beyond the scope of this project. Therefore, we recommend that mark-recapture efforts be conducted in 2010 and possibly beyond.



Location of western painted turtle, red-eared slider, and turtle nest observations at Winmar Wetlands.

**Site:** Inverness Wetland

**Survey Date:** 22 June 2009, 1430-1530.

**Survey Conditions:** 40% cloud cover, still (wind = Beaufort 0), mean air temperature of 72°F.

**Notes:** Surveyed site via kayak, entering from bridge at west end. No turtles observed. Site is mostly shallow (mean depth = 45-60 cm of water), with silty, flocculent bottom almost entirely devoid of vegetation, and interspersed with assorted trash. Water clarity is excellent (>1 meter). Mats of dead algae present over ca. 30% of surface area. Margins heavily vegetated, with fences close to pond banks (very small amount of upland habitat). Very small amount of basking structure (emergent logs) present in this site; all logs are around margins. Water area was found almost entirely devoid of aquatic life; one small threespine stickleback and a juvenile bull frog were observed at the outflow, under the west end bridge. However, a number of birds were present, including: a great blue heron (*Ardea herodias*), a belted kingfisher (*Ceryle alcyon*), several broods of mallard ducks (*Anas platyrhynchos*), several wood ducks (*Aix sponsa*), and a pair of Canada geese (*Branta canadensis*).

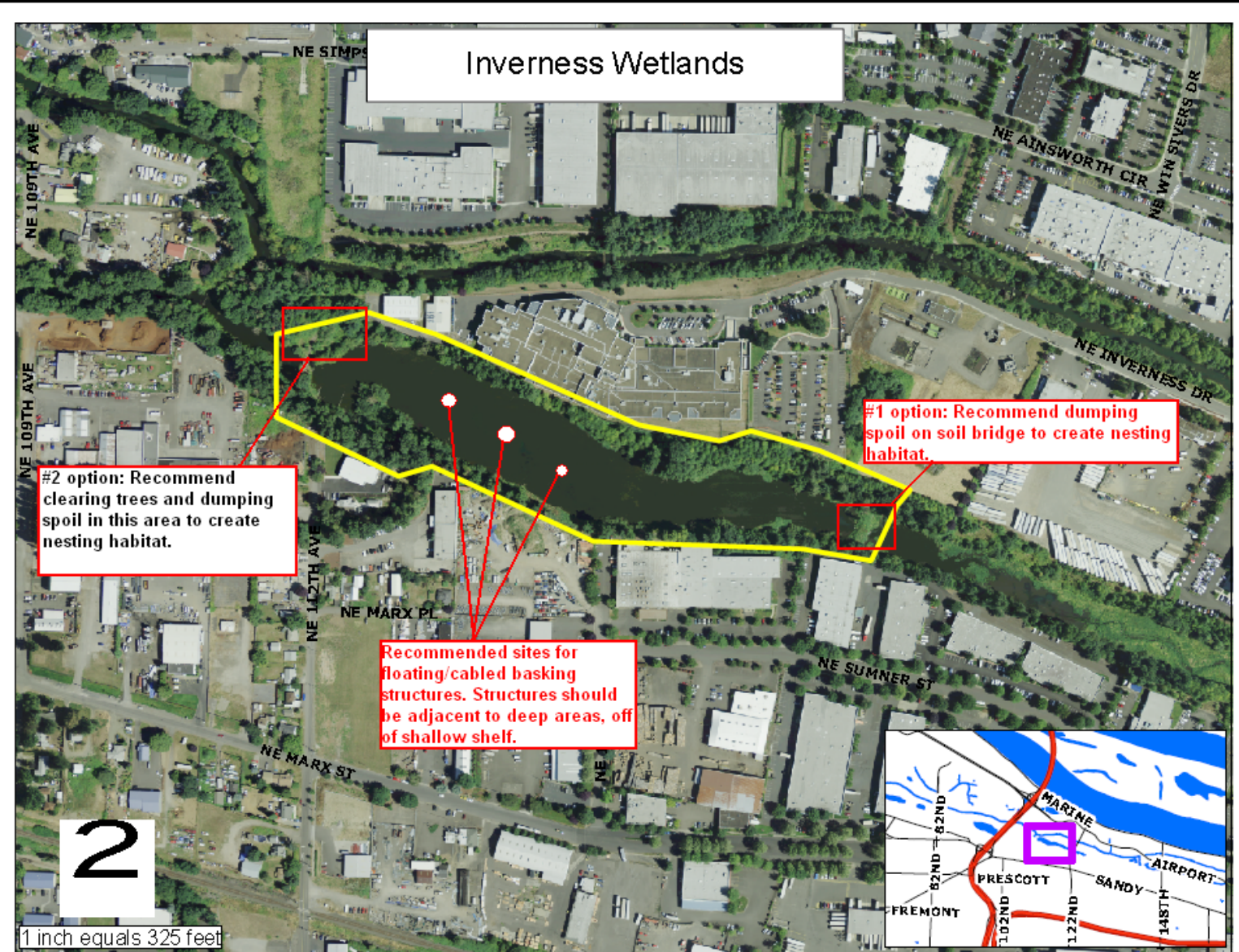
This site was also surveyed by Linda McGinnis, on 23 June 2009, from 1230-1300, under weather conditions of: high, sparse cloud cover, low wind, and air temperature of 82 F. Linda did not observe any turtles during her visit.

**Recommendations:** Overall, due to the proximity of development and the condition of the aquatic habitat, this site is of poor quality for turtles. However, if encouraging turtle use is desired, the following management recommendations are proposed:

1. Basking structure. Increasing the amount of basking structure, in the form of floating logs or simply felled trees, is strongly recommended. Due to the contour of the pond, the best basking structures would be floating logs or platforms, cabled to anchors such as cinder blocks, and installed at the center of the pond, adjacent to the deepest areas. Avoid placing cabled structures near edges or on a shallow shelf.

2. Nesting habitat. Nesting habitat at this site is extremely limited. Therefore, if encouraging turtle use is desired, placement of loose fill for turtles to lay eggs in is recommended. The best place to dump fill would be on the overgrown sewer dike at the east end of the site. This east end dike, though small, is currently the best nesting habitat present at the site, due to its composition and location. If restoration at the west end bridge is desired, it is recommended that as many trees as possible be felled along the northwest corner of the site (clearing a 20-40m<sup>2</sup> area), to reduce shading over the desired nest site, before dumping fill there. Fill can be mixed as previously described, or can be used as available, providing it allows for sufficient drainage and turtle digging (see above). Fill can be dumped from a minimum depth of six inches to as deep as is desired. Occasional herbicide applications will probably be required to prevent vegetative regrowth.





**Location of management recommendations for Inverness Wetlands.**

**Site:** Johnson Lake

**Survey Date and Time:** 24 June 2009, 1030-1210.

**Survey Conditions:** 10% cloud cover, still (wind = Beaufort 0-1), mean air temperature of 75°F.

**Notes:** Surveyed lake by walking perimeter, surrounding woods, shoreline. Visually surveyed for turtles; none seen. Carp and several species of waterfowl (mallard and wood ducks), as well as several great blue herons, observed in lake. Lake is shallow, turbid, and has no significant amount of submerged aquatic vegetation. Bottom is primarily soft silt. Small amount of basking structure present, mostly in the form of fallen logs around the east end and the extreme west end. Potential nesting habitat is limited to: a small strip along Glass Plant Road on the west/southwest corner of the lake (between the newly planted water quality structure and the plant, along the old road), and a small strip between the lake and NE Glass Plant Road on the east end of the lake. Woods surrounding the lake, particularly around the west end, are full of trash, with people living there. The portion of the Columbia Slough paralleling Johnson Lake is shallow, with deep, soft mud, and is heavily shaded – poor habitat for turtles.

**Comments:** Overall, the quality of this site for turtles is poor, due to the degraded condition of the aquatic habitat, the extremely limited amount of nesting area, and the relative isolation of this site by roads and development. While a few painted turtles may occur in the lake, there is a low risk to turtles as a result of proposed dredging and/or sediment capping activities. To further reduce risk, it is recommended that any dredging and/or sediment capping be conducted during the summer months (June-August), if possible, as this is when the water is warmest and the turtles are thus most active and best able to escape disturbance.

**Site:** Colwood Golf Course (Columbia and Whitaker Sloughs)

**Survey Date and Time:** 22 June 2009, 1240-1400.

**Survey Conditions:** 10% cloud cover, still (wind = Beaufort 0-1), mean air temperature of 76°F.

**Notes and Comments:** Area surveyed on this site included portions of Columbia and Whitaker Sloughs. On the course, neither represent very good habitat. That portion of Whitaker Slough upstream of the road crossing was shallow, muddy, and devoid of much aquatic vegetation. Although numerous downed trees lined the bank of the slough, it was quite shaded, preventing any opportunity for basking. In addition, it was relatively small in size, and bordered by manicured greens. The portion of Whitaker Slough downstream of the road crossing was much larger and more open (see account for Whitaker Slough, below), but very shallow and devoid of almost all aquatic cover, largely due to the presence of numerous large carp. Consequently, while this section of Whitaker Slough may be used as a movement corridor, and some turtles may be seen here (most likely in spring and early summer), its overall value to painted turtles is limited. That section of Columbia Slough bisecting the course is steep-banked, and possessed of a degree of flow. While some small beds of aquatic vegetation (primarily *Ceratophyllum*, but also some *Callitriche* in those portions that carp cannot readily reach) are present, large carp are too, and much cover is lacking. For these reasons, and the fact that human use of the area is, expectedly, high, this portion of Columbia Slough is of little value to painted turtles except as a movement corridor.

**Recommendations:** Though, given the constraints of the system, few restoration options are viable, the most feasible way to increase this area's value to painted turtles is to heavily vegetate the banks of the slough with shrubs such as *Spiraea* and creek (red-osier) dogwood (*Cornus stolonifera*). This will reduce accessibility of the creek to people and pets, as well as limit visibility of same to turtles, encouraging their movement through the area. These shrub species will not grow high enough to shade the channel to an extent that would discourage use by turtles.

**Site Name:** Whitaker Ponds

**Date Surveyed:** 18 June 2009, 1430-1730. 22 June 2009, 1545-1630.

**Survey Conditions:** 18 June 2009: 100% cloud cover (overcast), still (wind = Beaufort 0), mean air temperature of 76°F. 22 June 2009: 40% cloud cover, still (wind = Beaufort 0), mean air temperature of 72°F.

**Notes:**

18 June 2009: Walked ponds and edge of slough. One female western painted turtle, ca. 160mm carapace length, emerged onto log and began basking in NE corner of east pond, 1550 h. A second western painted turtle, ca. 155mm CL, observed at surface in an algae mat in SE corner of E. pond, same time. Large carp in both ponds; bullfrog juveniles (11, SVL = ca. 50-55mm) and adults (16, SVL =  $\geq$ 150mm SVL) observed in east end of east pond. Waterfowl (broods of mallards, wood ducks) and great blue herons also observed in east pond, as well as in west pond. Flock of 50 crows (*Corvus brachyrhynchos*) observed in cottonwood trees at west pond. Dead adult (150mm FL) prickly sculpin, live threespine stickleback, several adult bullfrogs, and freshwater mussels (*Anodonta* spp.) observed in west pond.

22 June 2009: One adult female painted turtle, ca. 170mm carapace length, was seen swimming at the water's surface approximately 200m upstream of the park canoe dock. Also observed in (or on the bank of) Whitaker Slough here were: two great blue herons, an adult raccoon (*Procyon lotor*), a feral cat (*Felis catus*), and several broods of mallards, as well as one brood of wood ducks. The slough here is fairly deep (>1.5m), very turbid (visibility = ca. 6 inches), and has steep, heavily vegetated banks with almost no riparian margin (fenced close to water). Basking structure (floating and downed logs) is abundant in some areas, absent along other reaches. Vegetation, primarily *Ceratophyllum*, is present in scattered patches. Overall, the habitat along this slough, as well as the abundance of predators, make it most suitable for adult turtles.

Sue Beilke (*pers. comm.*) reports that a small number of painted turtles ( $n \leq 4$ ) have been observed at this site for approximately the last fifteen years. Miss Melissa Sandoz (Outreach Director, Columbia Slough Watershed Council) reports having seen a number of painted turtles, and at least one red-eared slider, in the Whitaker Slough adjacent to the Whitaker Ponds, while canoeing in spring of 2009.

**Comments:**

The Whitaker Ponds and Slough together currently support a small population of western painted turtles. However, it is likely that this population is not reproducing enough to sustain it over the long term, and is thus slowly declining. Of the area available, the east pond contains the best habitat for all turtle life stages, whereas the Slough provides habitat for mostly adult and sub-adult turtles.

While it is likely that a few animals may be seen there early in the year (e.g., March), the west pond is currently of little value to turtles. This is primarily due to its extremely shallow nature and lack of aquatic vegetation. The east pond, by contrast,

contains the best turtle habitat at the site, especially at its eastern end, which is mostly shallow ( $\leq 1$  m depth) and heavily vegetated. This area represents the best habitat for turtle foraging and growth, and is likely the rearing area for most juvenile turtles hatched at the site. In contrast, the portion of Whitaker Slough bordering the ponds is suitable habitat mostly for adults, due to its depth and lack of the shallow, heavily vegetated, near-shore habitat required by the juveniles. In addition, the numerous turtle predators observed in the Slough in this area (bullfrogs, cats, herons, raccoons, etc.) are primarily capable of taking juvenile turtles; adults are safer due to their size, tendency to avoid shore, and increased swimming ability.

Turtle nesting was not observed at Whitaker Ponds, but probably occurs in the vicinity of the east pond, where the only suitable nesting habitat is found (save for a small portion in the front lawn of the Watershed Council office). Furthermore, given the small amount and poor quality of nesting habitat, it is unlikely that much reproduction is successful. Finally, it is known that painted turtles (especially females) will move between sites used for overwintering and those used for feeding, in some situations. It is likely that this occurs at Whitaker Ponds, with some movement of adult turtles between the Slough and the east pond occurring in the late spring and again at the end of summer, or in fall.

**Recommendations:** For the reasons listed above, the following management recommendations are proposed, if increasing the painted turtle population at Whitaker Ponds is desired:

1. Nesting habitat. The south-facing area between the east pond and the slough which was recently cleared of blackberries (see map) represents the best potential turtle nesting habitat in the area, due to its location and aspect. Advantages of location include its proximity to the best existing active-season habitat (the east end of the east pond), as well as being in the movement corridor between the pond and the Slough. Additionally, it is currently inaccessible to most visitors of the Ponds. However, it is currently useless as nesting habitat due to the thick thatch of live and dead blackberry canes covering the soil. If increasing the turtle population is desired, it is recommended that this area be graded to remove the blackberries and expose bare soil for nesting. Alternatively, the area can be covered with fill (at least a 30x30 m area, to a minimum of one foot [30cm] deep, though 2 feet [60cm] of fill would be ideal). If desired, the area can be graded and then covered with fill, for best effect. After grading and/or dumping is completed, the area will have to be sprayed with herbicide periodically to prevent blackberry regrowth.

Ideal fill for providing nesting habitat for western painted turtles consists of: 25% or less of fine clay, 25-50% sand, and 25% aggregate ( $< 1/4$ " [6 mm] diameter); aggregate may be mixed with loose organics. However, any available fill can be used, providing it does not have a high percentage (more than 50%) of organic material or silt which compacts easily and retains moisture, or is mostly large aggregate (e.g.,  $> 1$ " [25 mm] diameter) which prevents turtles from digging.

2. Movement corridor. To facilitate successful movement of turtles between the east pond and the Slough, it is recommended to direct turtle movement away from areas with high traffic. This can be done by encouraging turtles to cross from the east end of the east pond, rather than close to the junction of the two ponds or at the north ball field. Because painted turtles prefer to move under an open sky, clearing the area northeast of the (east) pond for nesting, as described above, should have the desired effect. In addition, it is strongly recommended that any new trails be built as to avoid this nesting area in order to reduce/minimize disturbance. Specifically, keep trails to the south side of the east pond, and avoid construction of any new trails east of the ball field on the north side of the pond.

3. Basking structure. Currently, some basking structure exists in the east pond, but most of this is adjacent to the edges. Installation of a few basking structures (cable logs or floating platforms to anchors such as cinder blocks) in the center of the east pond will probably increase turtle use of the pond.

4. Ball field disposition. The north ball field is located in an area (between the two ponds) where it would likely receive use by nesting turtles, were it not fenced off. If retention and continued use of the ballfield is desired, no management is recommended. This is because the field fence keeps turtles out of an area where nests would not be successful (due to field management) anyway. However, if removal of the ballfield is desired, simply taking out the fence would create a nest site for turtles. This nesting site would be useable as it currently exists, though use could be encouraged by dumping six inches or more of fill over the top, in the manner described above. If this site is turned into a nesting area, it is recommended that the area between the field and the road be fenced to reduce the number of turtles picked up by visitors or run over by maintenance vehicles. Because of the location of the field (farther from the water, next to the trail and road), the more secluded and better exposed (south-facing, less shaded) site northeast of the east pond would be a better nesting area.



# Whitaker Ponds

possible existing or potential nesting habitat on ballfield?

Recommend grading and/or dumping fill and spraying to create turtle nesting habitat and movement corridor to Whitaker Slough.

Recommended basking structure placement sites.

Area of east pond with best habitat and probable highest turtle use (both juveniles and adults).

# 2

1 inch equals 325 feet



Location of management recommendations at Whitaker Ponds.

**Site:** Whitaker Slough, from Whitaker Ponds east to Alderwood

**Survey Date and Time:** 23 June 2009, 1230-1700.

**Survey Conditions:** 5% cloud cover, still (wind = Beaufort 0-1), mean air temperature of 75°F.

**Comments:** Surveyed slough via kayak. Along this reach, the best turtle habitat is downstream of the 63<sup>rd</sup> Ave. crossing. In this area, the slough is generally deep (>1.5m maximum depth), with abundant basking structure (fallen logs) and beds of aquatic vegetation (mainly *Ceratophyllum* and *Elodea*). Because of the extremely limited amount of upland habitat, as well as the heavily vegetated condition in which it exists, no significant amount of nesting is likely to occur along this stretch. Therefore, this portion of the creek mainly provides active-season habitat for adult turtles (see account for Whitaker Ponds, above). The section of Whitaker Slough between 63<sup>rd</sup> Avenue and Alderwood is generally shallow (<50cm deep), silt-bottomed, and extremely turbid, with no aquatic vegetation and little basking structure. The exception to this is the east end of this section (that portion of the slough bordering Alderwood to approximately ninety meters west); the habitat here, though shallow, does have some aquatic vegetation and a few downed logs. Although the Colwood Golf Course borders this section and may attract turtles to nest, it is unlikely any nests placed on the managed landscape of the golf course survive. Overall, the portion of Whitaker Slough from 63<sup>rd</sup> Avenue to Alderwood is poor quality habitat for painted turtles.

**Site:** Bridgeton Slough, from NE 6<sup>th</sup> to west end

**Survey Date and Time:** 24 June 2009, 1240-1400.

**Survey Conditions:** 10% cloud cover, still (wind = Beaufort 0-1), mean air temperature of 76°F.

**Notes and Comments:** Slough was surveyed via walking perimeter. No turtles were observed; broods of mallard and domestic cross ducks, along with great blue herons, wood ducks, bull frogs, and mosquito fish (*Gambusia affinis*) were seen. Slough has silt bottom, with water of moderate clarity, and a mean depth along the survey reach of ca. 60 cm, though maximum depth exceeds 1.5m in several places. Thick beds of aquatic vegetation, including *Elodea*, *Ludwigia*, and *Myriophyllum*, make the water area good habitat for turtles. However, the extreme level of development and high number of roads around the slough, coupled with steep, heavily vegetated banks, make it unlikely that any turtles occurring there could achieve sufficient nesting success to sustain a population. Because this situation is unlikely to change (e.g., houses and roads will not be removed), this site is of poor quality for turtles.

**Site:** Heron Lakes Golf Course

**Survey Date and Time:** 10 July 2009, 0930-1400.

**Survey Conditions:** average of 65% cloud cover, light breeze (wind = Beaufort 2 from west), air temperature of 67°F at start, increasing to 82°F by end.

**Notes:** Walked Greenback and Great Blue courses; performed visual survey of water features. Course already receiving heavy play by 0930. Most water features on Greenback course are shallow, muddy, with very little basking structure and almost no aquatic vegetation. Carp abundant in most ponds and are the primary reason for the absence of aquatic macrophytes.

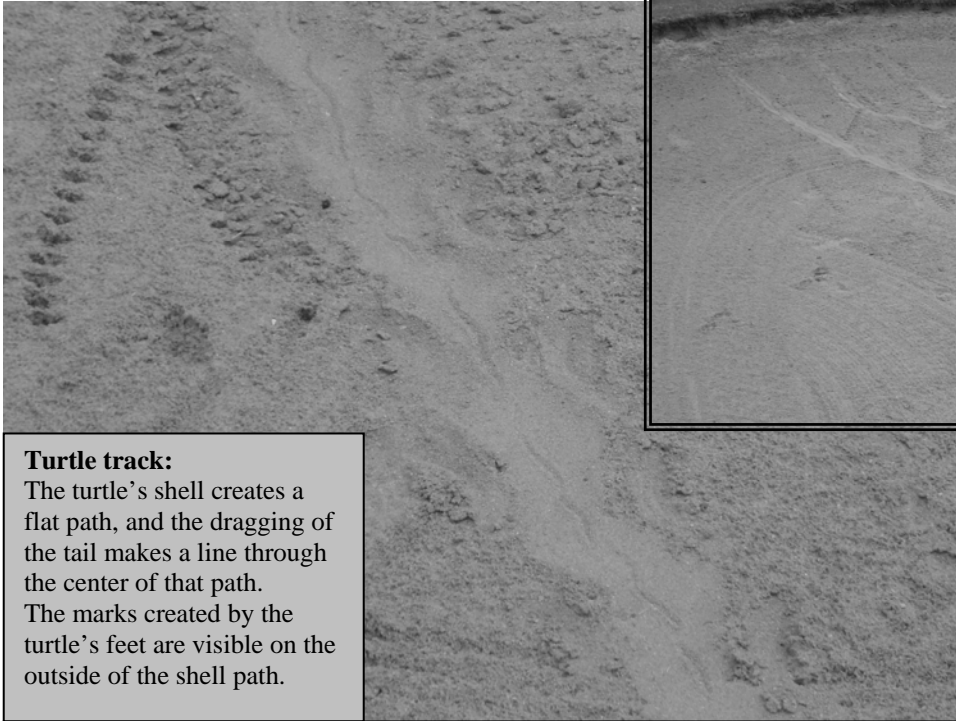
Turtles were observed in two places: the south water hazard on the 12<sup>th</sup> green, and the slough which borders the 17<sup>th</sup> green, and separates the golf course from the raceway. A single painted turtle (a ca. 155 mm CL female) was observed in the pond on the 12<sup>th</sup> green. Two painted turtles, an adult female (ca. 190 mm CL) and a juvenile (110.0 mm CL) female, were observed in the slough along the south border. The juvenile female was captured for examination, and found to be three years old, in relatively good health (weight = 190.0 g), though with an extremely thick growth of filamentous brown algae on its plastron and over most protected skin surfaces. This type of algae growth indicates a lack of emergent basking structure, as well as nutrient-laden water. In addition to these turtles, a set of fresh turtle tracks (<12 hours old) and an attempted nest were observed in a sand trap next to the aforementioned boundary slough on the 17<sup>th</sup> green.

The best aquatic habitat for turtles at this site consists of the more vegetated water features in the southwest corner, in the vicinity of the 12<sup>th</sup>-17<sup>th</sup> greens on the Great Blue course. This is primarily due to these features' relatively larger size, greater depth, and increased amount of aquatic vegetation relative to the other ponds on the course. In addition, they are closer to externally (off-site) occupied habitat, including the Columbia Slough. However, Force Lake and the pond on the 4<sup>th</sup> green also provide relatively good, highly vegetated active season habitat. Nesting habitat is more limited, and the best nesting habitat is also located around the southwest margin of the golf course.



*Left:* Water hazard on the 17<sup>th</sup> green of the Heron Lakes Golf Course. View looking west.  
*Right:* Western painted turtle at surface of 17<sup>th</sup> green water hazard, in algae mat.





**Turtle track:**  
The turtle's shell creates a flat path, and the dragging of the tail makes a line through the center of that path. The marks created by the turtle's feet are visible on the outside of the shell path.

Track made by nesting female painted turtle in sand trap on 17<sup>th</sup> green, Heron Lakes Golf Course.  
*Inset:* Larger view. Set of tracks on the right is wandering and erratic, and leads out of pond. The set of tracks on the left leads back to the water, and is much more direct. Nest attempt (incomplete) is visible at top of sand trap.



Brown algae growth on the plastron and skin surfaces of a juvenile painted turtle from the 17<sup>th</sup> green water hazard, Heron Lakes Golf Course.

**Comments:** Management for turtles on the Heron Lakes Golf Course presents a challenge, as most of the measures required to improve the situation for painted turtles run contrary to the desired management of the course. For example, turtles prefer areas with little disturbance, as well as barren, exposed soil for egg laying (as opposed to manicured greens). Most of the Heron Lakes course consists of areas that are attractive to turtles as nesting sites (e.g., greens and sand traps), but in which nests will ultimately fail. Because of the course's proximity to an existing source of turtles (the Columbia Slough), painted turtles will undoubtedly continue to wander onto the course. Sue Beilke (*pers. comm.*) reports observation of a small number ( $n \leq 5$ ) of turtles on the course for approximately the past 15 years. Unfortunately, it is likely that the population of turtles present is declining, and inadequate habitat currently exists to support a self-sustaining population of painted turtles over the long run.

**Recommendations:** Three management options are available for painted turtles at the Heron Lakes Golf Course:

The first of these options is to do nothing. Turtles will probably continue to be visible at the course for some years to come, slowly decreasing in number until the population is functionally extirpated, though occasional animals will wander in from the Columbia Slough.

The second option is to improve conditions for the turtles currently present on the course, such that the amount of reproduction required to sustain the population may not occur, but the course will be more turtle-friendly, and movement of turtles in and out of nearby areas (ponds, the Slough, etc.) will be facilitated. This option would mostly require vegetating the banks of course ponds, as outlined in #2, below, as well as installing a few basking structures in these vegetated ponds (see #3 below), if possible. Without creating additional nesting habitat, creative measures could be taken to improve the situation for the turtles which currently attempt to nest on the course. For example, if a nest is discovered in a sand trap, it could be flagged and players allowed a free drop if they hit a ball into that trap.

The third option is to take more extensive measures to make the course turtle-friendly, with the goal of retaining a reproducing population of painted turtles. If this is desired, the following actions are suggested:

1. The areas used most for nesting by course turtles should be identified, and those areas left unvegetated (e.g., no planting of grass) to allow turtle nests to succeed. Because these areas may have to be treated with herbicide in order to be kept open, some alternative (non-living) landscaping features – for example, arrangements of rocks, weathered logs, etc. may be desirable in order to preserve the aesthetic quality of the course. Another option are bare areas thinly vegetated with low-growing, native wildflowers, such as California poppies and lupines. Fortunately for the course, the area that would have to be treated in this manner is probably quite limited, given the small size of the turtle population.

2. The borders of water hazards important to turtles should be thickly planted with shrubs (native species include creek dogwood and *Spiraea*), as recommended for the Colwood Golf Course (above). This will limit visibility of people by turtles and reduce the amount of disturbance suffered by the reptiles, allowing them to bask and behave normally. It is worth noting that most of the turtles on the Blue Heron Golf Course were seen in the ponds with the most thickly vegetated banks and densest growths of aquatic plants (e.g., the 17<sup>th</sup> green pond). Using shrubs instead of trees will prevent the ponds from becoming too shaded to support turtles.

3. Basking structures, such as logs or platforms, should be installed in the centers of ponds important to turtles. This will allow turtles to climb out of the water to bask, which, in addition to being physiologically important as mentioned above, will help them rid themselves of the thick algae growths currently present on their shells. The structure installation can be done as outlined under the Inverness and Whitaker accounts.

**Site:** Ramsey Stormwater Wetlands

**Survey Date and Time:** 14 July 2009, 1120-1700.

**Survey Conditions:** 0% cloud cover, still (wind = Beaufort 0-1), air temperature of 71°F, increasing to 79°F during survey.

**Notes and Comments:** Surveyed with Sue Beilke until 13:00. Walked entire site belonging to City of Portland, as indicated on map. St. Johns constructed stormwater wetlands dry; water in St. Johns maintenance bay and Port wetlands (constructed marsh) only. Outside of City property, Ramsey ponds and Columbia Slough have water. Western painted turtles observed in St. Johns maintenance bay, Port wetlands (constructed marsh), Ramsey ponds. Red-eared sliders observed in St. Johns maintenance bay and Ramsey ponds. “Salmon Refugia” slough off of Columbia Slough currently too shallow and devoid of cover for turtle use. See below for details.

Turtles observed

Turtles were observed in three places: the St. Johns maintenance bay, the constructed marsh within the Port stormwater wetlands, and the Ramsey ponds owned by the Port of Portland, as follows:

*St. Johns maintenance bay:* A total of ten individual turtles were observed in this pond. Seven were adult painted turtles, from ca. 155-195 mm CL; at least two of these were adult males, and three were adult females. Three were red-eared sliders; one of these was an adult female, and the other two were juveniles, ca. 70 and 65 mm CL, respectively. A total of 9 postmetamorphic bullfrogs (7 adult and 2 juvenile frogs) were observed in this and the adjacent pond, as well. Interestingly, because this site is fenced, the only way for turtles to enter is by crawling beneath the gates or through an existing hole in the fence.



Juvenile slider turtle in the pristine waters of the St. Johns maintenance bay.

*Port stormwater wetlands:* A total of four adult painted turtles were observed here during the course of the survey. Three of these (a male ca. 175 mm CL and two females, ca. 170 and 185 mm CL, respectively) were seen basking on a log near the west end of the marsh; the fourth was an adult male, ca. 180 mm CL, observed in the water at the east end of the Port stormwater wetlands. An adult bullfrog was calling from this site during the survey.

*Ramsey ponds:* Though these ponds are outside the survey area, a quick glance over at the east pond from Port property revealed the presence of four painted turtles (three adult turtles, ca. 165-175 mm CL, and one juvenile, ca. 135 mm CL), as well as one red-eared slider (ca. 200 mm CL).



### Nesting activity

Nesting activity was observed in four places at the Ramsey wetlands site, as follows:

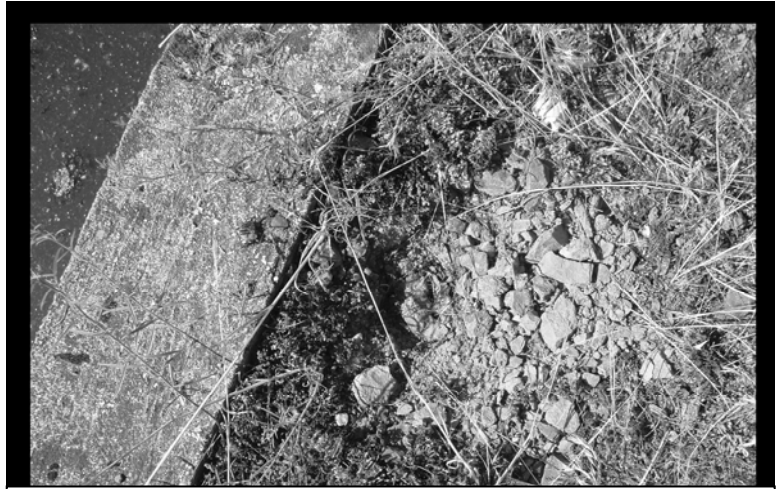
Eleven fresh (< 1 month) nesting attempts were observed in the gravel margin of the St. Johns maintenance bay. At least three of these were attributable to red-eared slider turtles. Though some of these eleven attempts represented failed nests (e.g., no eggs were deposited), no attempt was made to determine which nests contained eggs and which did not. The hole from a nest made in 2008 was also observed here, indicating at least one year's worth of previous attempts.

Two nesting attempts were observed east of the St. Johns maintenance bay: one at the edge of the road, ca. 8 m east of the gate, and another in the woods at the edge of the constructed wetlands, in the woods immediately east of the bay. Four nesting attempts were observed on the gravel road between the east end of the Port stormwater wetlands and the west end of the 'Salmon Refugia' slough. A single nesting attempt was observed in the gravel path into the site from the parking lot, ca. 20 m east of the entry gate.

In addition to these attempts, four fresh (< several hours old) red-eared slider nesting attempts were observed at the northeast corner of the Port of Portland-owned Ramsey ponds.

### Salmon Refugia slough

The 'Salmon Refugia' slough at the east end of the site was examined during this survey. No turtles were observed at that time. This slough provides a valuable movement corridor between the aquatic habitat at the Ramsey site and the Columbia Slough. However, this slough is extremely shallow and devoid of almost all aquatic vegetation, making it of limited value to turtles as anything other than a movement corridor. Though the lack of vegetation is due in part to the carp inhabiting the Columbia Slough, and cannot be easily remedied, improvement of this site for turtles could be easily accomplished by excavating at least part of the slough to greater depth (i.e., to hold at least 2 feet of water during June conditions), and by increasing the amount of cover (in the form of logs or root wads) present. Increasing the amount of cover would also improve the quality of the site with respect to salmonid fishes and native amphibian species. In the case of these, any amount of additional cover would be beneficial, though 8-10 times the current number of root wads would be optimal.



Turtle nest attempt at the St. Johns maintenance bay. Pile of light-colored gravel on the right is that removed from the nest hole by the turtle. To the left of the nest is the concrete wall of the maintenance bay.

**Recommendations:** In general, the Ramsey Stormwater site contains the highest-quality habitat of those visited during this survey, though the amount of habitat present is much less than that at Winmar. In addition to providing a limited quantity of good aquatic habitat, in the form of the constructed Port stormwater ponds, it also has good nesting habitat, and is also close to turtle-occupied habitat outside of the site's boundaries (the Ramsey ponds and the Columbia Slough), with no barriers to movement between this and either site. Because of this, the Ramsey site currently supports a small population of western painted turtles. Several aspects of this site deserve special consideration; they are as follows:

1. *Aquatic habitat:* The best aquatic habitat on the City property is the constructed marsh portion of the Port stormwater wetlands, which is heavily vegetated with pond lily (*Nymphaea* spp.), among other species. This area, though limited in scope, provides high-quality active season habitat for painted turtles. Improvement of this area to increase its carrying capacity (for painted turtles) could be done by excavating the shallow east end of this marsh to increase its depth and installing additional basking structures (e.g., logs) throughout the ponds, particularly if these were placed in the pond centers, away from the banks.

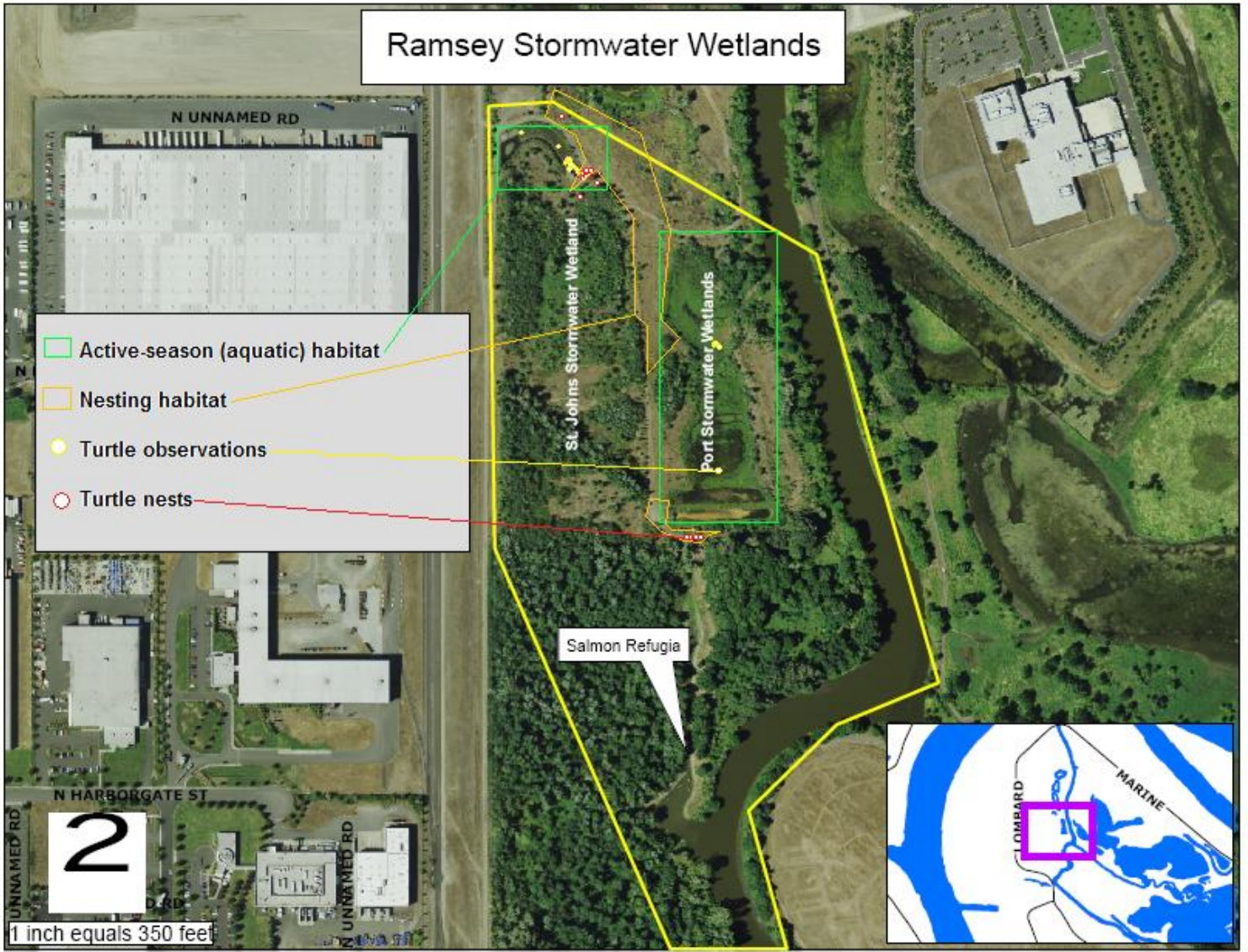
Surprisingly, the St. Johns maintenance bay had a number of turtles, including juvenile and yearling turtles. It is obvious that turtles are using this bay over at least a large portion of the year, and nest immediately adjacent to it. However, the success of these nests, as well as survival of the resulting juveniles, is unclear. Although the concrete construction of the basin allows it to warm up quickly, to the benefit of the turtles, it is possible that cleaning operations (i.e., dredging) could result in significant mortality, at least to young animals. If increasing turtle populations at the site is the goal, the situation in this settling pond should be carefully examined, to ensure that is not a reproductive 'sink' for painted turtles (an area that attracts adults to stay and nest, but where nests and/or juveniles do not survive). Alternatively, the fence around the pond could be re-designed to prevent turtle entry (extend fence to below ground level, and gates to flush with ground or concrete driveway).

The St. Johns stormwater wetlands themselves were dry by this survey, and are likely of little value to painted turtles, though they benefit a number of other wildlife species.

2. *Nesting habitat:* The Ramsey site has an abundance of high-quality nesting habitat, characterized by well-drained substrate in open locations which receive a long daily period of insolation. The best nesting habitat for painted turtles is currently: that area between the St. Johns maintenance bay and the constructed marsh (in the Port stormwater wetlands), the gravelly east side of the St. Johns maintenance bay, and the gravel road and filled area at the southeast side of the Port stormwater wetlands (between the wetlands and the Salmon Refugia slough). Because this area has been planted (with shrubs and trees), it will eventually become too shaded to provide suitable nesting habitat. Depending on vegetative growth rates, most of this habitat will be too shaded in roughly 10 years. Use of herbicide, dumping of sandy or gravelly fill, or selective planting can be used to

provide nesting habitat for painted turtles at the site. This need not be on City property; a suitable area exists between the Ramsey ponds and the Columbia Slough. This area is close enough to the aquatic habitat on City property to serve the turtles using these areas. Ideally, a nesting area should be at least 30 meters across and located away from tall trees which would shade the site.

3. *Red-eared sliders*: Red-eared slider turtles are established and successfully reproducing at this site. While the exact size of the slider population is unclear, it is apparent that they have been present at the site for some time; since at least 1999 (S. Beilke, *pers. comm.*). Because sliders are now reproducing, they cannot be successfully removed without several years of intensive trapping, as juvenile turtles are harder to catch than adults. This may be desirable, as the sliders have direct access to the Columbia Slough and thus the Willamette River. However, because slider turtles are already established in western Oregon (including the Willamette mainstem), and because existing data suggest that they may successfully co-exist with western painted turtles (C. Rombough, *unpubl. data*), a more productive use of available funding may be to first improve painted turtle habitat in the area. This would probably do more to directly increase the local painted turtle population than any attempts to remove sliders.
4. *Turtle introductions*: It should be mentioned that, while painted turtles and sliders may co-exist at a given site (see above), introductions of turtles can be potentially disastrous to local populations and, if turtle management is a priority, should be prevented to the maximum extent feasible. Turtles are capable of harboring a number of pathogenic bacterial and viral diseases without showing immediate symptoms, particularly under a simple external inspection. Due to the practices of the pet trade, captive turtles are frequently carriers of such diseases and should never be released into wild populations. This includes individuals of even native species whose origin is unknown. Because Ramsey is relatively accessible to the public, this possibility should be seriously considered.
5. *Site ownership*: As mentioned in the notes, only the portion of this site which is owned by the City of Portland was surveyed. However, with respect to turtle management, the small size and movement capacity of painted turtles necessitates that the site be managed as a whole, which may require coordination with the Port of Portland.



**Location of turtles, nests, and management recommendations at Ramsey Stormwater Wetlands.**

**Site:** Columbia Slough: mouth to bridge just upstream of Kelley Point Park canoe launch

**Survey Date and Time:** 22 June 2009, 1000-1310.

**Survey Conditions:** 100% cloud cover (overcast), still (wind = Beaufort 0-1), mean air temperature of 68°F.

**Notes and Comments:** Surveyed from mouth upstream to ca. 900m above canoe launch. No turtles observed. Channel here is mostly silt, with little basking structure (emergent woody debris). Shoreline and shallows largely bare, due to waves, tides, and feeding by carp and nutria. Juvenile carp (*Cyprinus carpio*) and one large (175mm FL) prickly sculpin (*Cottus asper*) observed in channel. Water very brown and turbid; visibility less than six inches. In general, this section is of low quality to adult painted turtles, and good habitat for juvenile turtles is lacking. Shallow off-channel ponds on north side of slough upstream of survey reach provide the best juvenile habitat; stormwater ponds on south bank along this reach are mostly dry on this date (22 June). A small amount of raised, drained soil suitable for nesting is present around these ponds, though the extent is very limited.

It should be noted that installation of large wood along this reach will probably result in increased visibility of turtles; such increased visibility does not necessarily reflect an increase in turtle use (either as number of turtles or time spent in the area). This area receives heavy use; the canoe launch had two anglers present during the entire survey, and three separate kayakers arrived during the survey interval. As with some of the other sites surveyed, this area is of little value to painted turtles save as a movement corridor.



## Johnson Creek

**Site:** Eastmoreland Golf Course

**Survey Date and Time:** 16 June 2009, 1600-1630.

**Survey Conditions:** Overcast. Mid 70's F . Nice day.

**Comments/Recommendatons:** Walking survey. Parked at Eastmoreland Golf Course Club House. Guided onto the course by golf cart.

There is one large pond, clear, occasional logs are on this shore, opposite the shore of Crystal Springs Rhododendron Garden. The continuation of the spring creek is just west of the pond, and contains ample basking logs and cover. Creek size varies from 10 - 14 ft wide, slow moving water 2 foot deep or greater. The short grass slopes, minimal tree cover, some shrubbery, full sun are good habitat for turtles except for the proximity to the Golf Course, however, this side of the course is not part of the maintained area and is fairly isolated from the general public. The turtles usually spotted here on the 11th and 12th holes haven't been seen by staff this year. The section of creek flowing West of the Golf Course shows signs of heavy otter use, there are a large number of clam middens along the banks. No turtles were observed.

Aquatic habitat could be improved for turtles by the addition of basking logs. Further investigation as to whether turtles use the site for nesting should be explored.



**Site:** Crystal Springs Rhododendron Garden

**Survey Date and Time:** 16 June 2009, 1530-1600; 23 July 2009, 1200-1400; 25 August 2009, 1500-1600.

**Survey Conditions:** 16 June 2009: Overcast. Mid 70's F. Nice day. 23 July 2009: Overcast. 74's F . Nice day, light breeze, clear, sparse high clouds. 25 August 2009: Sunny. 75 F . Nice day, light breeze.

**Comments:** Walking surveys. Parked at Crystal Springs parking area, entered from the north side of the pond.

Large pond, clear, occasional logs, mostly on the west shore near Eastmoreland Golf Course. The pond and water are highly managed for the park setting, with steep rock walls along most of the Eastern shoreline. Bounded by Reed College and a busy roadway to the northeast, SE 28th St open area to the north, Eastmoreland Golf Course to the west and south. The trail follows the waters edge on the east side of the pond. Aquatic vegetation includes cattails, and water lilies. Several common duck species, Canada geese, herons and various songbirds including small woodpeckers, jays, juncos, and towhees are present.

This is a popular park with a large amount of public attendance, surrounded by residential housing on three sides, golf course on one. The creek runs from Reed Canyon through Crystal Springs ponds, and through the golf course beyond, converging with Johnson Creek downstream near Tideman. It is partially treed, mostly open; the pond is in full sun. Nesting would be disrupted and risky given the amount of public frequenting the park. Sand or gravel areas consist of walking paths, golf course sand traps, and open lawns. No turtles observed during any visit. The addition of basking logs would increase habitat diversity for turtles and other wildlife.





**Site:** Reed Pond/Crystal Springs Canyon

**Survey Date and Time:** 16 June 2009, 1420-1530; 11 July 2009, 15:20-17:40; 14 July 2009: 1620-1730; 21 July 2009: 0900; 25 August 2009: 1400.

**Survey Conditions:** 16 June 2009: Overcast. Mid 73 F. Nice day. 11 July 2009: 81 F. Occasional high cirrus clouds. 14 July 2009: 78 F. Nice day. Occasional high cirrus clouds. 21 July 2009: Sunny, no breeze. 90 F. 25 August 2009: Sunny, no breeze. 73 F.

**Comments/Recommendations:** Walking survey. Parked at SE 34th St off Steele, entered from the north side of the pond.

This is a canyon surrounded by Reed College and residential housing. The creek slows through here creating shallow ponds. The water quality appears healthy, clear, lots of invertebrates. Ample logs and small island like logs with vegetation growing on them. Tall trees and a narrow canyon, it is wide enough for full sun on parts of the area through out the day. Possible nesting sites include the large south facing slopes with grassy areas. The trail follows well above the waters edge for 3/4 of the pond. Trail free area may also be a potential nesting area. This section of creek is adjacent to Crystal Springs and Eastmoreland Golf downstream to the West.

Though site was visited multiple times, turtles were only observed on 16 June. On that day, observed 1 turtle of unknown species near the footbridge west end and 2 Red eared sliders further west. This site offers some suitable habitat but is surrounded by development and has high human use. In order to sustain/protect any native turtles present, public outreach would need to occur to leave wildlife alone and to stop dumping of pet turtles.





**Site:** Lents Crossing II

**Survey Date and Time:** 30 August 2009, 1800.

**Survey Conditions:** Clear, hot. 78 F.

**Comments/Recommendations:** Walking survey. The creek runs behind and through a quiet business area on east side, the Springwater Trail on to the west, separating the area from dense residential. A tall dirt berm separates the Springwater a trail from the area. There are several road crossing bridges, and older out-of-use bridges. The stream banks have steep sides, the stream has slow moving sections. The creek widens and winds through this section from 60-80 ft across, creating several pool like sections of slow water. There are ample basking logs. The water level is low but not absent at the end of August. There are large areas of sunny nesting habitats, which are fairly isolated, considering the density in the surrounding area. The banks have several gradual incline areas where access to the potential nesting sites is possible. This appears to be an ancient landfill, possibly 100 years old, with concrete blocks well grown in, provide ample hiding for wildlife. Some trees and sparse brush, creating both sunny areas, and hiding/cover areas within short distances. There are a couple of small recent trash dumps, and indications of a recent small brush fire.

This is among the most likely areas for turtles to thrive, from SE 162nd Gresham, to the Willamette River. Reasonably isolated considering the location mid residential/commercial, ample water, basking, and relatively undisturbed nesting areas, both hiding and sunny terrain. No turtles were observed. It is recommended that portions of the creek bed be widened and deepened to provide better turtle habitat; this may include creating backwater ponds to provide permanent turtle habitat for feeding, basking, overwintering, etc.



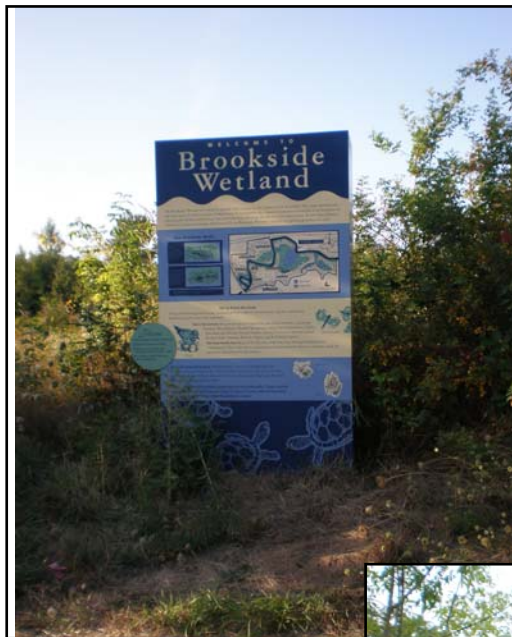
**Site:** Brookside Pond Park

**Survey Date and Time:** 11 July 2009, 1400-1500; 14 August 2009, 1300-1630; 25 August 2009, 1700-1800.

**Survey Conditions:** 11 July 2009: High sparse clouds. Nice day, light breeze. 80 F. 14 August 2009: Nice day; high, light overcast. 86 F. 25 August 2009: Nice day; high, light overcast. Light breeze. 87 F.

**Comments/Recommendations:** Walking survey. Slow moving water, pond, creek, basking logs in the creek. Beaver Dam North end of pond. One log in the pond. Gentle sloping banks with tall thick grass. Light noise, surrounded by housing and light industrial, highway traffic. Some grassy open spaces with sun in the park grounds, adjacent to walking trails. Creek is lined with large rocks along the banks, making them steep in most places and nearly impassible, heavily treed and shaded at the creek, with little to no sunny areas along the creek, some flood debris with assorted garbage mixed with branches. The creek depth is approximately 1 foot deep with occasional 2 foot sections this time of year. No turtles were observed at this site.

This site could be improved for turtles and other wildlife by adding basking logs. Some potential nesting habitat exists but is next to the walking trail which is heavily used. We recommend exploring whether other areas for nesting may be available that have less disturbance and would be away from human activities.





**Site:** Beggar's Tick Marsh Wildlife Refuge

**Survey Date and Time:** 06 June 2009, 1300-1500; 30 August 2009, 1600-1800.

**Survey Conditions:** 06 June 2009: Overcast with occasional sun breaks. Mid 70's F varying upon cloud cover, and location in the park: 72-76 F, overall. Nice day. 30 August 2009: Nice day. Sunny with 1% high clouds. 83 degrees F.

**Comments/Recommendations:** 06 June 2009: Walking survey. No turtles were seen at this site. This is a seasonal wetland entirely surrounded by industrial, adjacent to a major thoroughfare. Sections of trees surround a large shallow pond. The pond appears to have 10 inches or less of water, estimated by observing a feeding heron. The inlet creek is essentially dry today, firm mud in the creek bed. There are established paths through low brushy area with deciduous mix trees. Poplar, native oak. No turtles visible. No frogs visible. Basking sites consist of shallow sand bars and grass mats. Industrial sounds fairly loud, absent are any frog calls. Fair amount of bird song. Light garbage along the pond edges, consist of glass bottles, plastic bags, etc. About 10 ducks present, not including a hen with 7 new ducklings emerging from the brush. Birds included a towhee, a robin, 3 crows, a distant hawk (large), Bewick's Wren, a distance small woodpecker. Other small songbirds in the brush. A 12-16 inch racer snake. A large amount of crickets, and other small insects. No turtles were observed.

To improve the site for turtles, there needs to be some permanent aquatic habitat year-round. Possible enhancement options could include deepening a portion of the wetland, enlarging the inlet creek to enable water to flow all year and adding basking logs. Potential nesting habitat could be created on the south facing slope on the north side of the site, well away from the entrance which would help to minimize disturbance.



30 August 2009: Walking survey. Update on seasonal habitat changes. See 6/12/09 for additional descriptions of terrain.

This is a partially developed public park with a seasonal wetland entirely surrounded by light industrial, adjacent to a major thoroughfare, Foster Rd. Sections of trees surround a large shallow pond. The pond is dry now and covered with plant growth. No turtles visible. Basking sites consisted of shallow sand bars and grass mats when water was present. Industrial sounds fairly loud. Fair amount of bird song.



**8/30/09**

**Site:** Zenger Farms

**Survey Date and Time:** 30 October 2009: afternoon.

**Survey Conditions:** High clouds. 78 F. Nice day.

**Comments/Recommendations:** Walking survey. Parked in the parking upper lot near the information house. Foster Rd just east of SE 112th. This is a several acres site, of undeveloped bottomland thick with Reed grass. There are a few sparse stands of trees and low shrubs. Agriculture and orchard growing occur at the upper, south end, near the buildings. There is a small vintage stock pond about 12 feet across at one end of a canal, 3 - 6 ft wide, about 500 ft long. There are no basking logs. The acreage is completely surrounded by thick residential and light industrial, and a major thoroughfare, Foster Rd.

Any turtles finding their way into the site would be isolated from the greater population, and have a marginal amount of water. It is unknown if the water is present all year round. There is potential for this floodplain site to be integrated with an adjacent undeveloped area and Beggar's Tick Park. No turtles were observed.

Nesting habitat could be created with the removal of tall grasses in several areas. Aquatic habitats appear to be too shallow to support turtles year-round; a depth of 3-4 feet is recommended in order to provide areas for feeding, cover, overwintering, etc.





**Site:** Kelley Creek (Gresham, near Oxbow)

**Survey Date and Time:** 15 July 2009: 1000-1630.

**Survey Conditions:** High overcast, 89 degrees F.

**Comments:** Driving search for the creek, and walking survey at road crossings. Walked along street to view creek from overpasses. No moving water. Creek bed congested with foliage, low shrubs. Steeply sloping banks with tall thick grass and brush. Tall trees obstruct most sunlight, eliminating basking and nesting potential. Impenetrable in most places. 25 foot bank on each side of creek, sometimes incorporated into backyards with almost no buffer from dense housing, some local nurseries. Light noise. No turtles were observed. With almost no indication that substantial amount of water is ever in the creek bed, it is unlikely that turtles could stay, if allowed by dense population of residential housing.



**Site:** Kelley Creek/Johnson Creek Confluence. Includes: Kelly Creek backwater channels, Alsop, Brunkow, Circle Ave Wetlands, Schweitzer

**Survey Date and Time:** 25 August 2009.

**Survey Conditions:** not recorded.

**Comments:** Driving search, Walking survey. This is a residential area, with large properties that appear to have been former farmlands along the creek floodplain. The creek is a small shallow channel of about 15-20 feet wide with steep rock walls to maintain the channel. Residential properties end directly at the creek banks, with no buffer. The terrain is either backyard landscape lawns, or dense trees. Continuous shade throughout the day due to the canyon and trees/shrub cover. There are abundant neighborhood loose dogs. Some sections of the creek bed have ample logs, but little sun. The water quality is clear in this section, with an abundance of invertebrates. Turtles traveling along the creek will have difficulty exiting the water, and will find almost no basking or privacy, landing in backyards. No turtles were observed.

I searched for any wetlands described on the chart on four excursions. The Circle Av I found is strictly dense residential. The Martin off 158th ends at the tall North gate of a residence whose south side is bordered by the creek. 159th dead ends at a chain link fence and private driveway. 158th dead ends at Columbia River, across from Island, possibly the outflow of Kelley Creek.



## **Report Authors/Northwest Ecological Research Institute**

The Northwest Ecological Research Institute (NERI) is a small, independent, non-profit organization, composed of scientists, naturalists, educators and students. The authors of this report, Chris Rombough, Linda McGinnis and Sue Beilke, are NERI associates with a combined 55 years of turtle research conducted in the Pacific Northwest.

Since 1984, NERI has provided field research and training for government agencies, private organizations and consulting firms. It specializes in field studies of Pacific Northwest wildlife species, particularly amphibians, turtles, and secondary-cavity-nesting birds. Its efforts focus on habitat protection for native fauna and flora, and it provides advice on land management practices that maintain ecosystem functions. To date, NERI restoration projects include fencing cattle out of riparian areas, repositioning tide gates to restore salmon passage to breeding streams, and revegetating riparian areas with native plants. Monitoring projects include Wetland Wildlife Watch on the Mt. Hood NF, and monitoring wildlife and vegetation in mitigation wetlands. NERI has no employees, but carries out projects using teams of associates who are volunteers or contract consultants. It is a 501(c)(3) organization based in Portland, Oregon

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