Immaculate Green Hairstreak (*Callophrys affinis*) Inventory in the South Okanagan and Boundary Region, British Columbia, 2009 - FINAL

By

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Cover illustration: Immaculate Green Hairstreak (*Callophrys affinis*) sitting on linear-leaved daisy (*Erigeron linearis*) taken by Dawn Marks and Vicky Young, taken at White Lake Basin, May 21, 2009.

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EXECUTIVE SUMMARY

Immaculate Green Hairstreak butterfly (*Callophrys affinis*) is Blue-listed in British Columbia (S3 vulnerable) (British Columbia Conservation Data Centre [BC CDC] 2008). The BC Conservation Framework ranks this species as Priority 2 in Goal 2 (Prevent species and ecosystems from becoming at risk) and recommends inventory as an important action (2009).

A BC Conservation Corps crew conducted presence/not detected surveys for this species in the South Okanagan and Boundary regions between May 21 and June 4, 2009. Ten sites were surveyed over eight days, for a total of 78 hectares searched and a total search effort time of 38 hours and 20 minutes. Ten Immaculate Green Hairstreaks were observed; all occurred on hilltops or knolls within sagebrush (*Artemisia* spp.) – bluebunch wheatgrass (*Pseudoroegneria spicata*) habitats with nectar and host plants (*Eriogonum* spp., *Lupinus* spp. and *Erigeron* spp.).

The 2009 surveys helped to further define the presence of Immaculate Green Hairstreaks in the Okanagan and Boundary areas. More thorough searches (extending further north, and even further south) are needed to determine the full extent of occurrence and area of occupancy of this species and help meet the Conservation Framework priorities.

ACKNOWLEDGMENTS

Funding for this project was provided by the B.C. Ministry of Environment through the B.C Conservation Corps Program and the B.C. Conservation Framework. The project was administered by B.C. Conservation Foundation (Barb Waters). Guidance and mentorship were provided by Orville Dyer, Wildlife Biologist with the BC Ministry of Environment. Jennifer Heron, Invertebrate Specialist with the BC Ministry of Environment, provided additional advice. Training regarding butterfly behaviour and identification was provided by Dennis St. John (entomologist). Jerry Mitchell, Resource Inventory Specialist with the BC Ministry of Environment, and Aaron Reid, Wildlife Biologist with the BC Ministry of Environment, provided advice regarding data formatting and uploading to the Wildlife Species Inventory database. Carl McNaughton, South Okanagan Land Manager with The Nature Trust of British Columbia (TNT) provided access to TNT protected properties. Elizabeth Purkins, Park Ranger, accompanied surveyors at Gilpin Provincial Park. Don Gayton organized a visit to the South Okanagan Grasslands Protected Area for local naturalists; surveyors accompanied this visit and detected three Immaculate Green Hairstreaks. Sara Bunge provided surveyors with a map of South Okanagan Grasslands Protected Area. Leah Ramsay, Program Zoologist at the British Columbia Conservation Data Centre, provided previous records and accompanied surveyors at McIntyre Bluff and Blue Mountain TNT property. Photographs in this report are credited to Dawn Marks and Vicky Young.

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INTRODUCTION

SPECIES INFORMATION

Immaculate Green Hairstreak (*Callophrys affinis*) is Blue-listed in British Columbia (B.C.) (S3, vulnerable) by the B.C. Conservation Data Centre (2008). The B.C. Conservation Framework assessed this Hairstreak as Priority 2, under Goal 2 (Prevent species and ecosystems from becoming at risk) and has listed inventory as the action to be taken for this species (2009). Immaculate Green Hairstreak has not been assessed by the Committee on the Status of Endangered Wildlife in Canada [COSEWIC] (COSEWIC 2009).

The B.C. populations of Immaculate Green Hairstreak are considered *C. a. washingtonia* Clench, 1944. This subspecies ranges from the Southern Interior and West Kootenay of B.C. south to eastern Washington and northeastern Oregon (Guppy and Shepard 2001). In B.C., Immaculate Green Hairstreak is at the northernmost edge of its range; this makes British Columbian populations more susceptible to extreme weather and other localized catastrophic events (BC CDC 2009). Immaculate Green Hairstreak is associated with xeric valley bottoms of the Okanagan and southern interior regions, where the larvae feed on plants of the *Eriogonum* (buckwheat) genus (BC CDC 2009; Guppy and Shepard 2001). Immaculate Green Hairstreak flight period is from early May to early June depending on the advent of the warm spring weather. This species shares the same low elevation habitat as the similar looking, Sheridan's Hairstreak (*Callophrys sheridanii*), but has a flight period two to three weeks later (Guppy and Shepard 2001).

SURVEYS

In 2009 the B.C. Conservation Corps *Grassland Species Inventory Crew* conducted surveys for Immaculate Green Hairstreak within the Okanagan and Kettle watersheds. These surveys were part of a larger, multi-species inventory which included several other grassland priority species at risk: Tiger Beetles (*Cicindela* spp.), Nuttall's Cottontail (*Sylvilagus nuttallii*), *Efferia* Robberflies and two grassland sparrow species (Lark Sparrow [*Chondestes grammacus*] and Grasshopper Sparrow [*Ammodramus savannarum*]) (see Young and Marks 2009 for results from these surveys). These multi-species inventories were conducted in the Okanagan valley and Boundary region on selected provincial Crown lands including parks, ecological reserves and protected areas, as well as on privately protected properties (Figure 1).

The objective for the Immaculate Green Hairstreak portion of the inventory was to conduct a presence/not detected survey within potentially suitable habitats, including those not previously surveyed, and to document areas surveyed and habitat characteristics where Immaculate Green Hairstreaks were found.

STUDY AREA

Inventories were conducted on within the South Okanagan and Boundary regions of British Columbia (Figure 1).

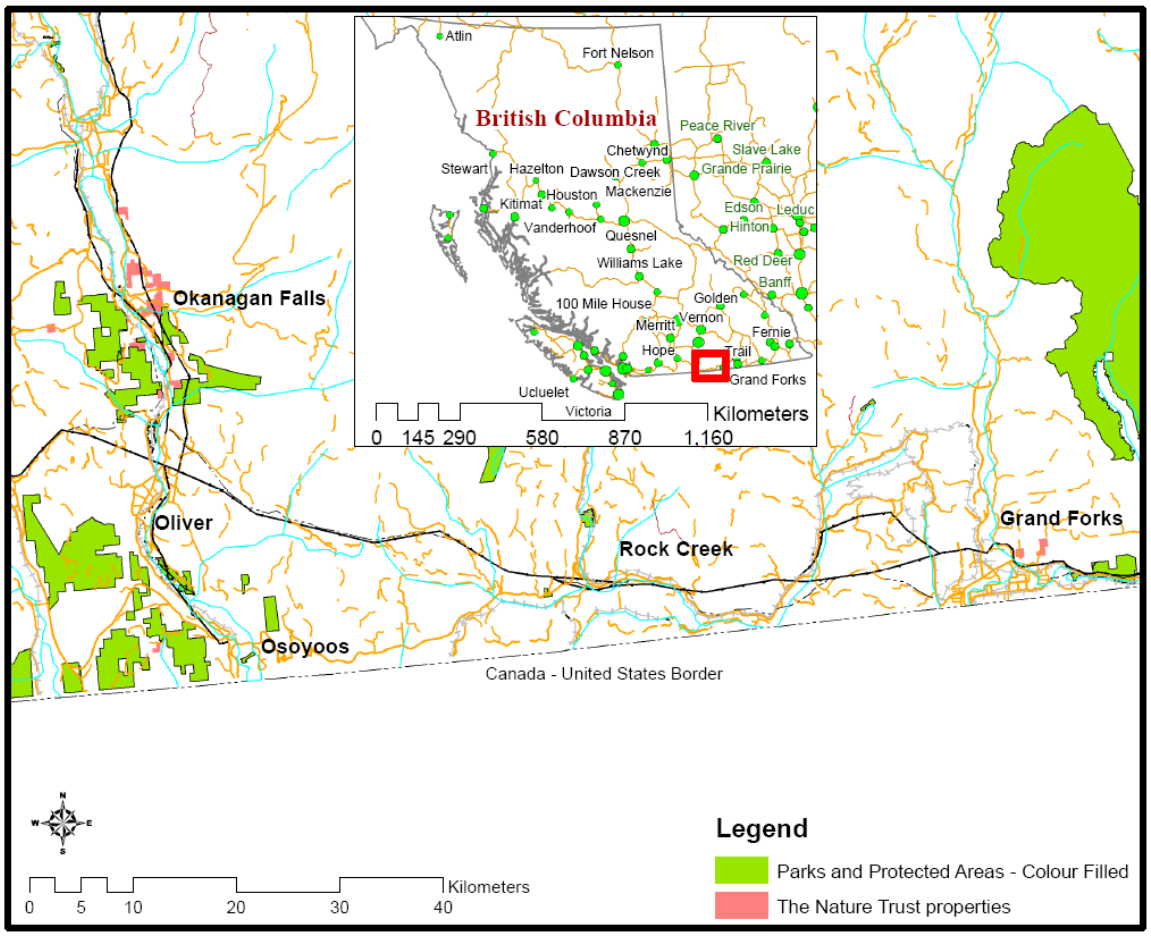

Figure 1. Immaculate Green Hairstreak inventory study area within British Columbia.

METHODS

The two-person crew received survey and identification training by Dennis St. John, local lepidopterist, in identification of Immaculate Green Hairstreak and its habitat. The crew was also trained to identify Sheridan's Hairstreak to avoid confusing these two similar species. Sheridan's Hairstreak is described as having a straight line of white spots on the ventral hindwing, while Immaculate Green Hairstreak can be distinguished by its "weak or partially to almost completely lacking" white spots (Guppy and Shepard 2001). The training for Sheridan's Hairstreak identification occurred on Mount Kobau (west of Osoyoos) at a higher elevation site (1827 metres) due to the later timing within the Sheridan's Hairstreak flight period.

Inventories were conducted by two surveyors between 0900 and 1600 on warm, sunny

days during Immaculate Green's flight period (May – early June). Surveys were terminated or not conducted during adverse weather conditions. Wandering transects were used to survey potential habitat. Wandering transects are random with no fixed direction and allow surveyors to target suitable habitat that occurs sporadically throughout the landscape. Surveyors targeted small hilltops in semi-arid steppe sagebrush-bluebunch-wheatgrass habitat which had abundant nectar and host plants (*Eriogonum* spp., *Lupinus* spp. and *Erigeron* spp.) based on observations noted by D. St. John (pers. comm., 2009). Suitable habitats were surveyed more intensely than the surrounding areas (e.g. knolls with flowering plants were searched thoroughly, while the swales and draws surrounding them were passed through). Nevertheless, during all other surveys, even those outside of suitable habitat (but still within the flying season), surveyors were aware of Immaculate Green Hairstreak characteristics and were prepared to note sightings if encountered.

Wandering transects and detections were recorded using handheld Garmin GPS (geographic positioning system) units. Tracks were recorded for each individual surveyor which consisted of a point placed automatically every 10 metres. Weather conditions were noted throughout the surveys including at the survey start and end times. When an Immaculate Green Hairstreak was observed the following information was recorded: date, time, number of individuals, location (UTM NAD 83), vegetation used, behaviour upon sighting (e.g. nectaring, flying, perching) and general habitat notes.

Surveyors often were able to observe Immaculate Green Hairstreaks perching on vegetation which made identification possible by sight, without net capture. When an individual was first seen in flight, surveyors were able to observe the specimen until it landed in order to confirm identification. Non-target butterfly species were not identified during these surveys.

GPS waypoints and tracks were uploaded into Garmin MapSource Version 6.15 to be converted to spreadsheets which were converted into shapefiles in ArcMap 9.2. All results, including spreadsheets and reports, were uploaded onto the Ministry of Environment's Wildlife Species Inventory database (http://www.env.gov.bc.ca/wildlife/wsi/index.htm).

GPS tracks were used to calculate the length of wandering transects and subsequent search area. Using ArcMap 9.2, a 10 meter buffer was drawn around each surveyor's tracks. Ten metres was selected because surveyors were visually targeting flowering nectar plants which are readily observed from this distance. Surveyors noted the duration of survey time which was then doubled here to reflect the search effort of two surveyors. Search effort and area were not calculated for observations of Immaculate Green Hairstreak on May 28, 2009. On this date, surveyors were participating in a grasslands tour with Dennis St. John and other local naturalists and GPS tracks were not recorded.

RESULTS

Surveys were conducted at six sites in the South Okanagan (Figure 2) and three in the Boundary region (Figure 3). Detailed information about these sites can be found in Appendix 1.

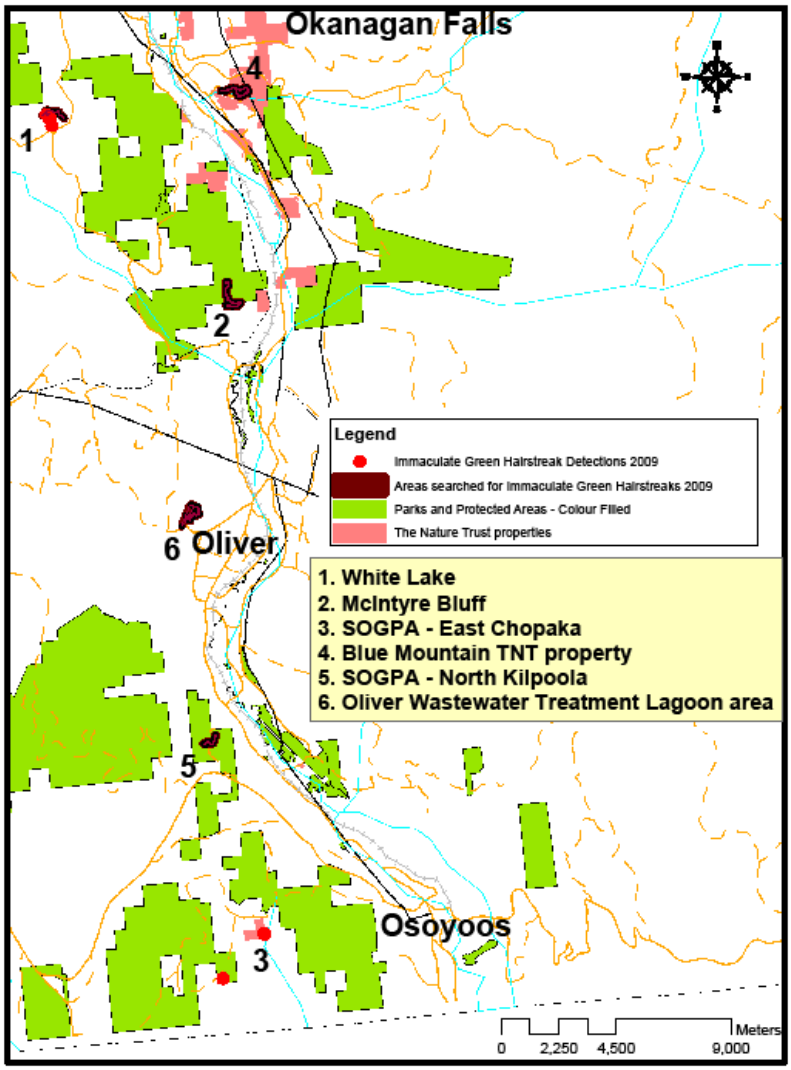

Figure 2. Sites surveyed for Immaculate Green Hairstreaks in the Southern Okanagan by the BCCC crew 2009. For more detailed site information, see Appendix 1.

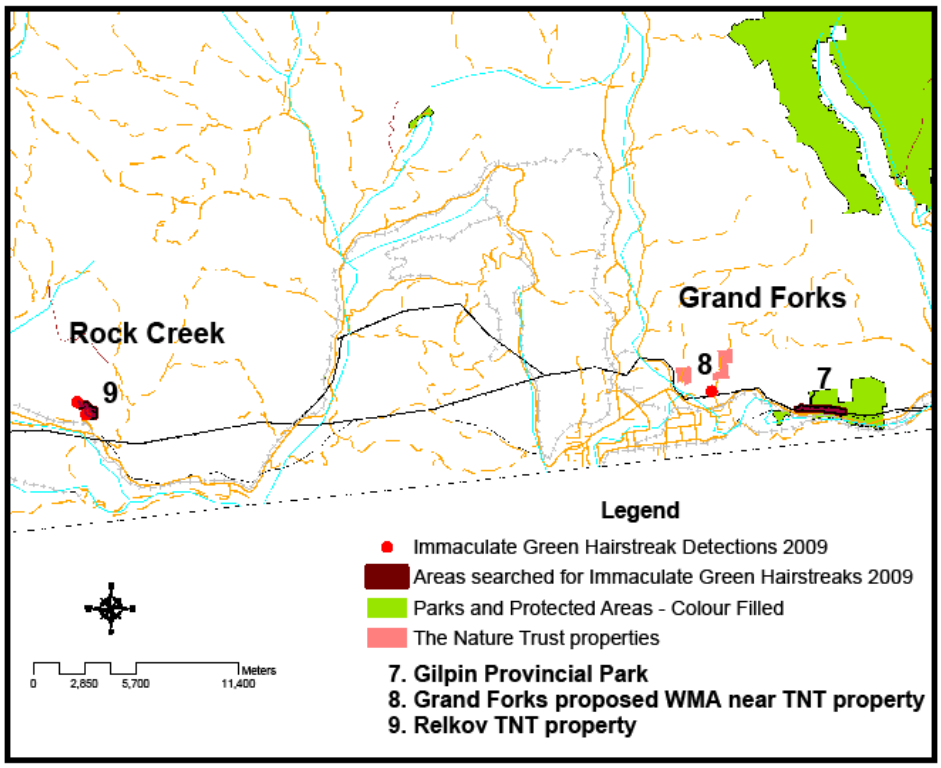

Figure 3. Areas surveyed for Immaculate Green Hairstreaks in the Boundary Region by the BCCC crew 2009. For more detailed site information, see Appendix 1.

Photographs were taken of two individuals (Figure 4.).

Figure 4. Photographs of two Immaculate Green Hairstreak individuals. Both found at the White Lake Basin, May 21, 2009.

Immaculate Green Hairstreak surveys in the Okanagan and Boundary regions were conducted on eight (8) survey dates between May 21 and June 4. Immaculate Green Hairstreaks were observed on four of these dates (May 21, May 28, June 3, and June 4, 2009) for a total count of ten observations. These surveys were at lower elevations (ranging between 610 metres and 972 metres) and were later in the flight periods outlined in Guppy and Shepard (2001) for these two hairstreak species. These observations were confirmed Immaculate Green Hairstreaks due to the elevation, timing and wing pattern of individuals which did not include linear white spotting on the ventral hindwing as expected in Sheridan's Hairstreaks.

Immaculate Green Hairstreak butterflies were most often observed as one individual; on one occasion, two individuals were observed along the same ridge of a small hill (Figure 2: Kilpoola Lake, The Nature Trust property [Location 3 on map], May 28, 2009).

Most Immaculate Green Hairstreaks were observed in flight (6/10 observations). The remaining observations were of two individuals perching on vegetation and two individuals nectaring on *Erigeron linearis* (linear-leaved daisy).

All observations occurred on hilltops or ridges. Immaculate Green Hairstreaks were not observed in gullies or grassland swales during these surveys; these habitats were not targeted during surveys. Vegetation occurring in areas where Immaculate Green Hairstreaks were observed includes sage (*Artemisia* sp.), bluebunch wheatgrass (*Pseudoroegneria spicata*), linear-leaved daisy (*Erigeron linearis*), parsnip-flowered buckwheat (*Eriogonum heracleoides*), and snow buckwheat (*Eriogonum niveum*); also recorded were yarrow (*Achillea millefolium*), lupines (*Lupinus* sp.), arrow-leaved balsamroot (*Balsamorhiza sagittata*) and common rabbit-brush (*Chrysothamnus nauseosus*). During these surveys, Immaculate Green Hairstreaks were not observed in areas with dense antelope-brush (*Purshia tridentata*) or ponderosa pine (*Pinus ponderosa*).

The total calculated area surveyed was 78 hectares and the total calculated search time was 38 hours and 20 minutes (for more detail see Table 1).

Table 1. Locations surveyed during BCCC 2009 Immaculate Green Hairstreak inventory including detections and quantified search effort.

Location	Site Number (from Fig. 1)	Date	Immaculate Green Hairstreak Detections	GPS Track Wandering Transect Length (km) (this has not been doubled)	Search Area (ha)	Search Time (doubled to account for the presence of 2 surveyors)
White Lake Basin (NRC lands)*	1	May 21, 2009	4	3.0	14	6hrs
McIntyre Bluff Provincial Park	2	May 27, 2009	0	2.8	10	5hrs
SOGPA – East Chopaka*	3	May 28, 2009	1	See Methods for these sites		
Kilpoola Lake – TNT*	3	May 28, 2009	2			
Blue Mountain TNT property	4	May 29, 2009	0	2.6	9	6hrs 20min
SOGPA – North Kilpoola	5	June 1, 2009	0	1	4	1hr 50min
Oliver Wastewater Treatment Lagoon Area	6	June 2, 2009	0	2.1	7	4hrs 30min
Gilpin Provincial Park	7	June 3, 2009	0	4.9	18	6hrs
Grand Forks WMA area near TNT property	8	June 3, 2009	1	GPS tracks not recorded.	1	40min
Relkov TNT property	9	June 4, 2009	2	4.1	15	8hrs
Total:		8 days	10	20.5 km	78	38hrs 20min

* Surveyors were accompanied by local Lepidoptera expert, Dennis St. John

DISCUSSION

Based on the observations of Dennis St. John, local lepidopterist, surveyors were trained to search knolls and ridges in association with *Eriogonum* spp., while surveying for Immaculate Green Hairstreaks. Guppy and Shepard's treatise on Butterflies in British Columbia (2001) notes that *C. affinis* is often found in dry gullies in association with *Eriogonum* spp. Surveyors in 2009 did not target dry gullies and so cannot comment with confidence on habitat preferences apart than to say that targeting knolls and ridges was found to be an effective search strategy.

Using this search strategy within a multi-species inventory framework, surveyors visited 10 properties and covered over 20 kilometers while conducting wandering transects. Overall, 78 hectares were surveyed over 38 hours and 20 minutes. In total, 10 Immaculate Green Hairstreaks were found: four on NRC lands at White Lake Basin; one on protected

provincial Crown land within South Okanagan Grasslands Protected Are; two on land privately protected by The Nature Trust of British Columbia at Kilpoola Lake, one on provincial Crown land within the boundaries of a proposed Wildlife Management Area in Grand Forks, and two on land privately protected by The Nature Trust of British Columbia at the Relkov property, near Rock Creek.

Results from our survey confirm the presence of Immaculate Green Hairstreak in the Rock Creek area. Although not all available data or habitat was checked as part of this inventory, our results suggest that Immaculate Green Hairstreaks occur between the areas previously reported. This information expands the known range of the species (as noted in Guppy and Shepard [2001] which shows no Immaculate Green Hairstreak records from the Kettle drainage, other than Grand Forks).

The BC Conservation Data Centre (2008) has mapped occurrences of Immaculate Green Hairstreaks in the North Okanagan in the Vernon area. The most recent observation, as recorded in the CDC Survey data, was in 1996 (BC CDC 2009). Although surveyors in 2009 visited the Vernon area on one date in May to conduct multi-species surveys, the weather was unsuitable for butterfly inventory.

A consequence of the multi-species approach is that inventory effort was spread across multiple target taxa and habitats and less area was surveyed for this species specifically. Wandering transect lengths, recorded by GPS Tracks, include distances in both targeted and surrounding habitats. Therefore, search area and search time calculated includes effort targeted at several species. As such, there will be an overestimation of search effort if applied to each individual species.

Most adult butterflies have only short flight windows (a few weeks). Focusing survey efforts on a targeted butterfly species during their optimum flight periods would provide more detailed information for these species. Surveyors could shift their focus from the multi-species approach during these flight windows if necessary. Placing a greater emphasis on surveying target butterfly species during optimal survey times would allow more sites to be inventoried thoroughly. It is difficult to obtain funding for single species of butterflies unless the species is federally listed, and so a multi-species approach remains a valid option for conducting inventories for species of special concern such as Immaculate Green Hairstreak.

The 2009 BCCC surveys helped further determine the presence of Immaculate Green Hairstreaks throughout the Okanagan and Boundary areas. More thorough inventories would be needed to determine the extent of this species in these areas and help meet the Conservation Framework's Priorities.

RECOMMENDATIONS

- Future inventory should concentrate on hilltops and ridges to help focus searches for Immaculate Green Hairstreaks.
    - Future studies may wish to compare the effectiveness of searching hilltops and ridges versus searching dry gullies. Although this was not attempted during 2009 inventory, surveyors noted that the methods followed, based on observations by Dennis St. John, were effective search tools.

- Further inventory should be conducted between the Okanagan valley and Boundary (Grand Forks area) region to determine if there are additional Immaculate Green Hairstreak sites between these two regions.

- During inventory conducted earlier in the season the collection of voucher specimens is recommended when species identification is uncertain or may be questioned

- Inventory should be prioritized for the Vernon area in areas where Immaculate Green Hairstreaks have been previously recorded, but not surveyed in 2009 due to inclement weather.

- Inventory for target species must be ranked in order of importance prior to the field season to ensure sufficient search effort is allocated to each target group in a multi-species approach.
    - While a single species approach is preferred for Immaculate Green Hairstreaks because of the focus surveyors are able to give target species, this is not always a practical approach, especially for other butterfly species. A variable effort multi-species approach is also suggested wherein focus can be shifted to Immaculate Green Hairstreaks during their flight period and away from this butterfly during unsuitable survey times (due to weather or season).

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APPENDIX 1. Survey Site Information

1. White Lake Basin – NRC lands (North of White Lake – Twin Lakes Rd.)

Ownership: Federal Crown land with grazing lease
Inventory Date: May 21, 2009
Surveyors: Dawn Marks, Vicky Young, Dennis St. John
Weather: No precipitation; cloud cover less than 50%; wind 3-4; temperature 20^{o} C at 15:22.
General Habitat: Habitat included hilltops and ridges, sage – bluebunch wheatgrass, lupine (*Lupinus sulphurous* and *L. sericeus*), linear-leaved daisy (*Erigeron linearis*), and parsnip-flowered buckwheat (*Eriogonum heracleoides*).
Condition: This land is grazed.
Landscape Context: Crown land, with NRC, TNT and Provincial Park land beyond the surrounding area.
Comments: Four Immaculate Green Hairstreaks were observed at this location. This area was visited with Dennis St. John for BCCC training.

2. McIntyre Bluff

Ownership: Crown - Provincial Park
Inventory Date: May 27, 2009
Surveyors: Vicky Young, Dawn Marks, Leah Ramsay
Weather: No precipitation; cloud cover less than 50%; wind 2-3
Start Time: 10:30 End Time: 13:00
General Habitat: Sage (*Artemisia tridentata*), some antelope brush (*Purshia tridentata*), bluebunch wheatgrass (*Pseudoroegneria spicata*), rocky outcrops and Ponderosa pine (*Pinus ponderosa*) are present at this site.
Condition: This land experiences recreational hiking and biking along marked trails. Signage is also present marking areas undergoing ecological restoration, which are off limits to recreational users.
Landscape Context: McIntyre Bluff overlooks Vaseux Lake and is composed of provincial park land and other ownerships. Covert Farms is located at the base of the trail.
Comments: No Immaculate Green Hairstreaks were observed on this date. The surveys followed the trail from the park boundary along Covert Farm to Rattlesnake Lake. Other target species included Tiger Beetles, Nuttall's Cottontail and Lark Sparrow.

3. South Okanagan Grasslands Protected Area (Including Kilpoola Lake TNT Property)

Ownership: Crown – Protected Area; Private – The Nature Trust of British Columbia
Date Visited: May 28, 2009
Visitors: Dennis St. John, Dawn Marks, Vicky Young and other local naturalists
Weather: No precipitation; cloud cover less than 50%

General Habitat: Sage (*Artemisia tridentata* and *A. tripartita*), bluebunch wheatgrass (*Pseudoroegneria spicata*) grassland with buckwheats (*Eriogonum* spp.), linear-leaved daisy (*Erigeron linearis*), arrow-leaved balsamroot (*Balsamorhiza sagittata*), lupine (*Lupinus sp.*) and bitterroot (*Lewisia rediviva*).
Condition:
Landscape Context:
Comments: Three Immaculate Green Hairstreaks were observed on this date (two at the Kilpoola Lake TNT property and one within the South Okanagan Grasslands Protected Area). The BCCC crew was participating in a grasslands fieldtrip, organized by Don Gayton, to visit grazing enclosures within the Protected Area. Immaculate Green Hairstreaks were observed during incidental stops designed to view some of the different areas within the region (*i.e.* not for the specific purpose of surveying for Immaculate Green Hairstreaks).

4. Blue Mountain TNT Property:

Ownership: Private – The Nature Trust of British Columbia
Inventory Date: May 29, 2009
Surveyors: Vicky Young, Dawn Marks, Orville Dyer, Leah Ramsay
Weather: No precipitation; clear skies; wind 3-4; Temperature 24^{o} C at the start (10:15), 30^{o} C at the end (13:24)
General Habitat: Antelope brush (*Purshia tridentata*), bluebunch wheatgrass (*Pseudoroegneria spicata*), with rocky outcrops and depressions throughout. Ponderosa pine (*Pinus ponderosa*) and interior Douglas-fir (*Pseudotsuga menziesii* var. *glauca*) present.
Condition: Large areas of antelope-brush, some invasive plants such as cheatgrass (*Bromus tectorum*), and sulphur cinquefoil (*Potentilla recta*). Old road and wildlife trails throughout property.
Landscape Context: Larger parcel of land protected as TNT property. Vineyards and road down are found below and surrounding the property.
Comments: No Immaculate Green Hairstreaks were observed on this date. Other target species included Tiger Beetles, Nuttall's Cottontail and Lark Sparrow.

5. Kilpoola North

Ownership: Crown – Protected Area (South Okanagan Grasslands Protected Area)
Inventory Date: June 1, 2009
Surveyors: Dawn Marks and Vicky Young
Weather: No precipitation; clear skies; wind 4-5; Temperature 24^{o} C at the end (9:45)
General Habitat: Sage (*Artemisia tridentata*) with bluebunch wheatgrass (*Pseudoroegneria spicata*) and needle-and-thread grass (*Stipa comata*). Some ponderosa pine (*Pinus ponderosa*) and interior Douglas-fir (*Pseudotsuga menziesii* var. *glauca*) are present.
Condition: Disturbance from cattle. High amount of invasive plants including cheatgrass (*Bromus tectorum*), and mustard sp. are present at this site.
Landscape Context: Kilpoola North is a large protected area adjacent to Highway 3 and private land with a large gravel pit on it. A road cuts through the park to service a

telecommunications station. Cattle grazing occurs on this site.

Comments: This site was visited early in the morning to conduct Grasshopper Sparrow surveys. As the temperature warmed up and we walked along hills and ridges (as opposed to depressions and draws) surveys switched to target Immaculate Green Hairstreaks and Nuttall's Cottontail (8:51am). No Immaculate Green Hairstreaks were observed at this site.

6. Oliver Wastewater Treatment Lagoon Area

Ownership: Crown

Inventory Date: June 2, 2009

Surveyors: Vicky Young and Dawn Marks

Weather: No precipitation; clear skies; wind 3; Temperature 27° C at the start, 29° C at the end.

Start Time: 11:40 End Time: 13:55

General Habitat: Antelope brush (*Purshia tridentata*) (very large in some areas), sage (*Artemisia tridentata*), rock outcrops, hills and ridges, buckwheat species (*Eriogonum niveum* and *E. heracleoides*) are present at this site. Not many nectar plants were observed. Some ponderosa pine (*Pinus ponderosa*) is present.

Condition: This area is cattle grazed. ATV/dirt bike trails are present. There is an abundance of cheatgrass (*Bromus tectorum*) at this site; very few nectar plants observed.

Landscape Context: Crown land adjacent to Oliver Wastewater Treatment plant lagoons. Agricultural areas are present beyond. Stinky Lake is found to the north.

Comments: No Immaculate Green Hairstreaks were observed at this site. Nuttall's Cottontail were also targeted at this site.

7. Gilpin Provincial Park

Ownership: Crown – Provincial Park

Inventory Date: June 3, 2009

Surveyors: Dawn Marks and Vicky Young (accompanied by Elizabeth Purkins, BC Parks Ranger)

Weather: No precipitation; clear skies; wind 2-3; Temperature 26° C at the start, 31° C at the end.

Start Time: 11:15 End Time: 14:45

General Habitat: South facing slope with many rocky outcrops, some bluebunch wheatgrass (*Pseudoroegneria spicata*) and needle-and-thread grass (*Stipa comata*), but lots of weedy plant species are present. Ponderosa pine (*Pinus ponderosa*) is present, becoming more forested with climbing elevation.

Condition: High amounts of cheatgrass (*Bromus tectorum*), Dalmatian toadflax (*Linaria genistifolia* ssp. *dalmatica*) in some areas and other weeds to a lesser degree including diffuse knapweed (*Centaurea diffusa*), mustard and invasive bulbous grass. There were signs of chemical and biological controls for invasive plants within the park.

Landscape Context: Power lines cross the bottom section of the Provincial Park. Moderate recreational activities occur within the park. Grazing is permitted within

the park in the fall. This site is adjacent to a Wildlife Habitat Area and is within a proposed Wildlife Management Area.

Comments: No Immaculate Green Hairstreaks were observed at this site. Patches of *Eriogonum* (buckwheat) and other flowering plants were targeted for Immaculate Green Hairstreaks. (Blues were seen).

8. Grand Forks proposed WMA near TNT Property

Ownership: Crown, Proposed Wildlife Management Area
Inventory Date: June 3, 2009
Surveyors: Vicky Young and Dawn Marks
Weather: No precipitation; clear skies
General Habitat: Roadside hilltops with large patches of *Eriogonum* (buckwheat).
Condition: Unknown.
Landscape Context: Unknown.
Comments: This area was first passed through on the way to visit the parcel owned by The Nature Trust of British Columbia that is found to the north. There were cattle present in the TNT property, and the elevation increased quickly. Surveyors were not able to see ideal Immaculate Green Hairstreak habitat within the TNT property from the road, and so left without surveying the property. After leaving the TNT property surveyors stopped to check suitable habitat that had been noted while on the way to the TNT property (small hills/knolls with plentiful flowering plants). These knolls were quickly checked and one Immaculate Green Hairstreak was found. This area is within the boundary of a proposed Wildlife Management Area.

9. Relkov TNT Property

Ownership: Private – The Nature Trust of British Columbia
Inventory Date: June 4, 2009
Surveyors: Vicky Young and Dawn Marks
Weather: No precipitation; clear skies; wind 2; Temperature 13^{o} C at the start, 33^{o} C at the end.
Start Time: 8:25 End Time: 13:00
General Habitat: South facing slopes with hills, rock outcrops and small ridges. Bluebunch wheatgrass (*Pseudoroegneria spicata*) and arrow-leaved balsamroot (*Balsamorhiza sagittata*) are plentiful. Buckwheat (*Eriogonum heracleoides* and *E. niveum*) and linear-leaved daisy (*Erigeron linearis*) are present and were targeted during searches. Ponderosa pines (*Pinus ponderosa*) are present to the north and on the western portion of the property (beyond the gully). Note: big sage (*Artemisia tridentata*) and antelope brush (*Purshia tridentata*) are NOT present.
Condition: Rural residence, now protected by The Nature Trust of BC. Few weeds, though cheatgrass (*Bromus tectorum*) and sulphur cinquefoil (*Potentilla recta*) are present in some areas. Habitat overall seems to be in good natural condition. The amount of area protected is relatively small.
Landscape Context: Surrounding areas include private grasslands/ranch areas and Crown

forested/logged areas above. There is very little evidence of grazing on the TNT property.

Comments: Two Immaculate Green Hairstreaks were observed at this site, one on the south facing slope near the residences, the other on a hilltop across the gully. Earlier in the morning listening stations for Grasshopper Sparrow were held. There was an unconfirmed detection of an Immaculate Green Hairstreak from Orville Dyer during a previous visit to this site. Surveyors located the area of this previous detection and did detect an Immaculate.