Final Report of

An Inventory of the adult Butterflies and Odonata

on the Anderson Properties

Lincoln and Bristol Townships, Addison County, Vt. USA

during part of the 2003 field season.

Report to the Colby Hill Ecological Project

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Introduction

This is the fifth consecutive annual report on the species diversity of the adult butterflies and odonata of the Lester Anderson farms in Lincoln and Bristol Townships, Addison Co.,Vt, USA, a part of the Colby Hill Ecological Project.

During the field season of 2003 the project area was inventoried during four dates: one complete and three partial days, a limited effort similar to the 1999 season but much less than that for the three field seasons of 2000 through 2002.

The data for the occurrences of adult insects for the 2003 field season are presented in summary tables similar to those in the previous reports. I also have included selected notes of natural history observations that seemed particularly germane to the overall goal of the project, namely to understand biological diversity on the project area. These miscellaneous observations are quite difficult to quantify and are not presented in tabular form, particularly those that are primarily behavioral in context. The most notable was the observation of many exuviae of odonates at Guthrie Pond in June. Although larvae of odonata or lepidoptera have not been a focus of this general inventory of adult odonata and butterflies, a rather unique opportunity presented itself to describe a general emergence of odonate larvae from Guthrie Pond. I attempted to identify the exuviae to determine which were emerging from the pond. (The exuviae are the empty shells of the last larval instar stage, left after the newly emerged adults have eclosed). I carefully studied each of the individual exuviae under a dissecting scope and compared them with pertinent keys in various literature sources. I am quite confident that my identifications are correct although I do not regard myself as an expert in the identification of all larvae or exuviae (please see the discussion below).

Teneral adults were seen flying from the pond edge after eclosing from their exuviae. Unfortunately, because of their extremely elusive pattern of flight from the pond, I was unable to net any of the emerging teneral adults.

(No monitoring of odonata or lepidoptera was done during the field season of 2004 due to personal circumstances of health).

Methods

The same general procedure was followed as during previous field seasons. Namely, random searches or walks were conducted on selected areas of all four farms with most of the limited effort concentrated on the Guthrie and Pierce farms, particularly at sites where the inventorying experience of the previous four seasons suggested that there was likely to be a relatively high biodiversity or information return for the effort. As in previous years, considerable time was spent at Guthrie Pond, especially in inventorying odonata. Inventories were conducted for a full day on 20

May and partial days on the 6th and 9th of June.and the 8th of August. I combined the data from the two June dates in the tables.

Brief details of the itinerary for each day follow:

20 May- at Bancroft, Guthrie and Pierce farms from circa 1030-1755 hrs.(all times are local DST time)

The weather was relatively cool and breezy. The cloud cover approached about 90 % in the early afternoon and then started to clear toward the end of the day. There was a brief sprinkle. Overall, not ideal conditions for the flight activity of adult odonata and butterflies. However hundreds if not thousands of unidentified micro-moths were seen flying up from the vegetation of the Guthrie field They were a type of pyralid. No collecting of these was done. (Many moths fly on relatively cool days when few if any adult butterflies are active.) (It is obvious that there is a great deal yet to be learned about the moth fauna on the Project area).

From 1030 to 1205 I partially surveyed the Guthrie and Bancroft farms. I made four checks at Guthrie Pond. In the past I've reported differences in the diurnal activity of odonata at Guthrie Pond, some species seem more crepuscular, others are more active at mid-day when ambient air temperatures are generally highest. I know of little detailed data on the relative diurnal activity of the odonate community at any ecological setting. Guthrie Pond would be ideal for this type of investigation on the odonata.

Most data for specific habitats are simple presence and absence records of species, not times of the relative diurnal activity of the odonate guild at a location. Little to nothing is known about how possible differences in activity are related to either simple physical parameters and/or more complex biological factors. We know essentially nothing about how species partition their ecological universe, either in relative terms of how resources are utilized or how species packing and other factors influence the use of resources and other basic biological properties of a guild of similar insects living in the same area.

I checked only the field portion of the Bancroft Farm. I returned to Guthrie Pond from the Pierce Farm at 1730-1755 hrs for a final check. At the Pierce Farm I inventoried the Upper Isham Brook complex from 1425 to 1555 hrs and the lower part of the farm, south of the main dirt road, from 1605-1725 hrs. I checked the lower woodland pond, the marsh/swamp complex south of the pond, then followed the small intermittent stream south to Isham Brook, through the lowland, moist hemlock woods. I returned by way of the drier upland white pine woodland and then walked across the edge of the field, south of the road. In general, I followed the routes I've taken on the Pierce Farm during previous seasons of inventory.

(I encountered Jim Andrews with his field assistant at the Guthrie Pond during the interim between visiting farms. This caused a time gap in the census effort for the day. The interchange with these herpetologists was most enlightening).

6 June- three hours on the area, circa 1400-1700 hrs.

It was about 40 % overcast but warm enough for considerable adult insect activity. Based on the relatively large number of newly emerging (teneral) odonate

adults that were seen, the conditions seemed ideal for adult activity. Many adult dragonflies (Anisoptera) were seen at Guthrie Pond and some in the Bancroft woodlot. In addition, many exuviae of dragonflies were present on emergent vegetation, primarily cattails, around Guthrie Pond. Essentially all the adults appeared to be freshly eclosed or tenerals. I saw no exuviae of damselflies. These are, however, relatively small, very fragile, and difficult to discern in the field. In general, damselflies were present in very low relative numbers compared to dragonflies.

This was the first time in my five years of observations of odonata on the Project area that I was present in the spring just after and/or during a major emergence of ultimate larval instars from Guthrie Pond (and possibly other aquatic sites in the area). This provided an excellent opportunity to determine which species of dragonflies were breeding at Guthrie Pond and not merely flying over the pond to feed as adults. (I did report some data on the emergence of darners (*Aeshna* spp.) from ponds in late summer in an earlier report).

I spent most of the inventory time at the Guthrie farm, much at Guthrie Pond. I inventoried Guthrie Pond twice: 1410-1435 hrs and 1630-1645 hrs. I also checked the Guthrie and Bancroft woodlands. I walked west along an open wooded trail in the Bancroft woodlot toward the intermittent stream that bounds the area, mostly the section along Guthrie Farm. In the Bancroft woods, I was very surprised to encounter several species of recently eclosed species of anisoptera, more than I had ever seen in previous years in any of the woodlands.

The stream was running very high close, to the top of its banks. I walked up it to the Guthrie woodland swamp and clearing area. I didn't anticipate seeing any adult odonates along the stream but wanted to verify this assumption. I saw none.

There were many *P. napi,* the Mustard White, more or less throughout all of the wooded areas of the Bancroft and Guthrie farms. I saw several pairs *en copula*.

I didn't inventory at the Wells or the Pierce farms.

9 June-three hours on the area from circa 1300-1600 hrs

Weather was not ideal for adult butterfly and odonate activity. It was 90-100 % overcast with a brief cold shower while I was along Upper Isham Brook.

I spent most of the field time at Wells Farm and the Upper Isham Brook complex of the Pierce Farm. I checked Guthrie Pond once and collected additional exuviae from the cattails. In the two days that I was absent from the site, additional dragonflies had emerged from the pond. It was obvious that most of the exuviae I saw on the 9th were not present on the 6th of June, although I may have over-looked a few on the 6th.

If time permitted it would be relatively easy to check the pond edge carefully every day, thus permitting a determination of the rate of emergence of odonata from the pond. This could be a simple classroom exercise at most ponds in the region, conducted by older children, properly supervised. With patience and diligence it would even be possible to photograph specific individuals as they emerged from exuviae and hardened enough to fly. Most, however, undoubtedly crawl from the water under cover of darkness and perhaps also eclose at night. But not all! With the help of experts a reference collection of identified exuviae could eventually be built-up for reference by the children and their teachers. A wealth of data could gradually be accumulated from this relatively simple exercise and exchanged among schools.

I didn't do any inventorying at other Guthrie Farm sites and none at the Bancroft farm.

8 Oct- on the area from 1045-1610 hrs

Weather generally quite ideal for adult insect activity: clear skies, warming, and a mild southerly wind.

Guthrie Farm- first I checked Guthrie Pond and then the woodland swamp site of Guthrie Farm. Before I left the area, I checked Guthrie Pond in the late afternoon.

Pierce Farm-1355-1530-checked the Upper Isham Brook complex

I did not inventory at either the Bancroft or Wells farms.

(See the summary tables, 1-4, for the presence/absence records of identified species of adult odonata and butterflies at sites that were inventoried on the four farms).

Results and Discussion

Butterflies:

13 species of adult butterflies were recorded, 12 were positively identified to species. None of the butterflies were new to the total project list for the four previous seasons. One unidentified species of *Polygonia* was seen. Only one butterfly was a skipper, the Hobomok S. One individual was seen flying in the Bancroft woodland in June. This is one of the earliest flying skippers. The exotic European S. which is very common in the fields of the farms was not recorded, undoubtedly because no inventory was conducted in July. As indicated in earlier reports, this species appears to be single brooded on the study area. Elsewhere, it has been reported to be multi-brooded.

Pieris napi, the Mustard White, was very widespread over the Project farms, more so than in any previous year of inventory. It was found well out into the fields of the Guthrie Farm, tens of meters from the nearest woodland edge. In my entire previous experience with inventorying butterflies in Vermont, I've never before encountered this species so regularly in fields, especially those that are mowed annually. For example, on 6 June I netted and released five male *P. napi* over Guthrie Field. I saw one nectaring at *Ranunculus acris*, a common buttercup in the fields of all the farms. I suspect individual butterflies were flying out over the fields primarily to locate nectar resources. Curiously, although I saw *P napi* in the Pierce woodlot, I didn't see any over the fields of the Pierce Farm even though buttercups and other possible nectar sources were present. The high relative abundance of the Mustard White, compared to previous years of inventory was surprising. I did not record any of this beautiful native species in either 2001 or 2002. In fact, I was quite concerned that the species was becoming extinct (locally) from the general Project area. In 2003, however, its population density seemed relatively high throughout most of the wooded areas of the farms. Some individuals of the Mustard White were even seen outside of their typical habitat, namely over grassy fields, as indicated above. These great variations in annual density of a species support the need for long-term population studies.

Odonata:

Of 12 species recorded in the adult stage, 11 were positively identified to species. None were new to the total project list for the previous four seasons. One unidentified species of bluet (*Enallagma*) was seen, undoubtedly *E. aspersum.* I was not able to net the individual. Another species, the Hudsonian Whiteface was identified only from the exuviae stage. It was never seen as an adult.

Coenagrion resolutum, the Taiga Bluet, had been recorded only once before, in 2001. One male, the only one seen of this species, was collected at Guthrie Pond on 6 June. This species looks superficially in the field like many of the blue-colored bluets (*Enallagma* spp.) but can be generally distinguished, even at a distance, by the overall more greenish hue of its sides, especially in the males. Thus, it was not apt to be overlooked, even if not netted.

During the two brief inventories of June, it was apparent that a major exclosion of several species of dragonflies was ongoing at the Guthrie and Bancroft farms. I collected and studied a total of 47 exuviae (32 on the 6th and 15 on the 9th) from mostly cattail stems (*Typha* sp.), all from around Guthrie Pond. I roughly estimated that I recovered at least 90 % of the exuviae that were attached to the cattails. I attempted to sex the exuviae but am not positive that my determinations of sex were correct (exuviae of skimmers are very challenging to sex). I believe, based on a preliminary determination, that the majority were females which, if true, is not expected. Knowing what the relative sex ratios are at emergence would be of great biological interest. I would predict that males would eclose first.

I saw many teneral adult dragonflies flying from the edge of Guthrie Pond and also observed several very fresh-looking individuals of at least three other species of dragonflies along the woodland trail in the Bancroft woodland. A single fresh adult individual was also netted along the field edge of the lower Pierce Farm. The latter was the Four-spotted Skimmer, a very bright colored female, obviously quite recently eclosed. I also saw several very fresh-looking adult *P. lydia* (Common Whitetail) that were perched on the grass of the Wells Farm in June. I've never encountered this species in such a location before. Apparently the fresh adults had eclosed from a nearby aquatic site (though I saw no exuviae at the pond in the Wells field) and flown to the upland field of the Wells Farm to bask and further harden. I would have missed the whitetails completely had I not walked through the field and disturbed them.

I was not able to net any of the adults that were eclosing from the exuviae at the Guthrie Pond. The imagos flew quite rapidly from the edge of the pond and then steeply upward to heights of tens of meters. Their flight vectors then tracked toward the woodland edges, both to the east and south of the pond, but not always to the nearest edge (the one to the east of the pond). Their initial strategy seemed to be: get out (eclose) and then head to the woodlands as rapidly as possible! All the adult dragonflies emerging from the pond appeared to be the same species: based on their general size, shape,coloration and flight pattern. In contrast to the behavior of the adults freshly eclosing from Guthrie Pond, the very fresh looking dragonflies in the Bancroft woods were mostly basking (and probably hardening) in the sunlit areas along the wooded trail. That is, they seemed to have eclosed several days earlier,

from unknown aquatic breeding sites and then flew to the Bancroft woodland. I was able to net a few and observed others very closely, along the woodland trail.

I also saw several individuals of dragonflies resting and apparently feeding along the warm east-facing woodland edges of the Bancroft and Guthrie farms. After a rather extended and frustrated effort, I finally managed to net a single individual. It was the Beaverpond Baskettail, *Epitheca canis.*

I am more convinced that adult dragonflies, in general, even when recently eclosed, are far more wary and elusive, as a general rule than adult butterflies. They seem more aware of objects approaching them in their environment than do butterflies. Of course perching or hovering butterflies are often occupied with taking nectar from flowers, whereas perching dragonflies are seemingly sitting on a perch, apparently totally alert to any approaching object that could be a potential predator (or prey ?) and ready to fly at an instant if approached too closely.

I believe all or most dragonflies along the woodland edges were *E. canis* since their wings generally appeared to be dusky in color, typical of this species, especially the females. However, *Ladona julia* may have been present. *E. canis* is the earliest member of its genus to be active in the spring in this region and, among the true skimmers, *julia* is one of the earliest. I did see several of the latter along the woodland trail of the Bancroft woodlot. In fact, I was a bit surprised to see adults there since they are usually reported along the edges of marshes, fens and bogs.

However, it is well known with respect to the dispersal of teneral odonates of many species, that they initially leave the habitat from which they emerge and then fly away from their typical breeding habitats to mature and harden. Later, they return as mature adults to the breeding habitats. Details of such movements have not been well documented for most species. It is all a rather dynamic and fascinating business and scientists know essentially nothing about this aspect of the life histories of odonates. And it is unquestionably important to know about these movements and habitat use over the landscape if we are to understand the complete biological requirements of the species that exhibit this type of behavior.

45 of the 47 relatively fresh exuviae I collected at Guthrie Pond were determined by me to be the American Emerald,*Cordulia shurtleffi.* I did collect one adult individual of this species at Guthrie Pond in June. Another exuviae, though quite damaged was probably the latter species and one exuviae collected on the 9 June, was definitely a leucorrhinid (a whiteface). I determined it as *Leucorrhinia hudsonica,* the Hudsonian Whiteface. Exuviae of this latter genus can be very challenging to verify to species. (However, I am quite confident of my identification based on morphological details and biogeographic criteria such as the range of other possible conspecifics).

The Hudsonian is normally the first of its genus to eclose in this region. No adults of the Hudsonian or any other whiteface were seen anywhere else on the entire Project area. This was the only exuviae I saw of this genus at Guthrie Pond. Whitefaces were apparently just starting to emerge between the 6th and 9th of June. By contrast, when I, in June, checked, the cattails for exuviae at the small and intermittent pond of the Wells Farm field, I found none. This small pond often is near to completely dry in late summer whereas I have never found Guthrie Pond dry.

There was, based primarily on the analysis of the exuviae studied from Guthrie Pond, a major eclosion of the American Emerald during the first two weeks of June. The total of 45 exuviae of this species exceeds the entire total of **adults** of this species recorded at the pond in the previous four seasons. The American Emerald is the most common emerald (of the subfamily Corduliinae) I've recorded at Guthrie Pond. This year was the first time, however, that I had definite proof that Guthrie Pond was also one major site where it breeds on the Project area.

I am not sure where the other recorded adult dragonflies (of at least three species) eclosed. I am particularly interested in learning whether the Beaverpond Baskettail breeds on the Project area-perhaps at Guthrie Pond although I never found any exuviae of this species nor definitely observed any adults at the pond when I was there in June 2003. I doubt it breeds at Guthrie Pond.

Miscellaneous natural history observations of possible biological interest:

Aside from the results reported above, I made two observations on amphibia of possible biological interest: 1) on the 20th of May I was quite astounded to discover the American Toad, *Bufo americanus,* almost certainly breeding in the stream of upper Isham Brook. While conducting the usual "transect" along the upper brook I heard the breeding trill of adult toads and was amazed to see several pairs in amplexus in the moving water of the brook, along the edge. This site was far from any lentic water (pools, ponds, etc.). However, I saw no ova although I may have been present at the site before egg laying began. There were at least ten, perhaps 30 adult individuals of toads present along a 20-30 meter stretch of the upper part of the brook, well downstream from the beaver meadow below the beaver dam. That is, by most conventional behavioral criteria, this was a breeding site of the American toad, albeit at a **lotic** site, **not lentic**. Although I have never personally observed nor read of this species breeding at any lotic site, I have not done an exhaustive survey of the literature to verify whether breeding of this species has been reported in any lotic environment. I did however check several comprehensive field guides to amphibia of the general northeastern region.

The beaver dam, tens of meters upstream from this site had been recently deliberately breached by someone and perhaps a breeding population of the American toad in the pond behind the dam was "forced" to move downstream after the breaching? However, there was still standing water behind the dam which appeared deep enough and suitable as a typical lentic breeding habitus and I personally doubt that this possible scenario is what happened in 2003.

However, If ova were laid in the stream or in puddles along the edge of the stream, it appears that they would be washed downstream. I can only conjecture at the outcome of this apparently very unusual breeding behavior with respect to the natural selection of the species. Was there something unusual about the dynamics of the Upper Isham Brook ecosystem in or prior to 2003. that led to this seemingly unusual breeding behavior of the American toad? To reiterate, I've never seen such behavior before nor am I aware that it has ever been reported in the literature.

Was this normal breeding behavior or not, that is the question?

2) the other observation was that of hundreds, in fact undoubtedly thousands, of relatively large ranid tadpoles swimming near the surface in Guthrie Pond in June. I believe they were tadpoles of *Rana clamitans*, the Green Frog. They were roughly 3-6 cms in total length and had proportionately rather large heads. I saw none with developing limbs although I didn't handle any of the tadpoles. In my view, based on this general observation, the only other possible species with tadpoles of this size would be the Bullfrog. And, in my recollection back over the four years of inventory at Guthrie Pond I am virtually certain I've never seen this latter species at the pond although I vaguely remember hearing it call once. This is the first spring, however, when I've ever seen such large congregations of *Rana* tadpoles at the pond. At this site, it probably takes the Green Frog two to three years to metamorphose to an adult. I saw no such tadpoles in October and am therefore quite sure that the tadpoles I saw in June must have metamorphosed to adults during the interim between June and October. This probably occurred in late July or early August.

Other species of *Rana* seem to be absent or rare at Guthrie Pond. By comparison, I have regularly seen the Green Frog at the pond often attempting to predate odonata along the edges, especially the teneral damselflies.

In addition to the observations reported above I did collect several species of carabids and orthoptera. The carabids have not all been identified to species, the orthoptera have.

After five years of inventory of the adult odonates and butterflies, I estimate that I have documented over 90 % of the species of butterflies and 80 % of the odonata that might be expected on the Project area. However, we know essentially nothing about other aspects of their biology.

We are still just scratching the surface with respect to understanding the biodiversity of the other major groups of insects on the CHEP area, much less those of the so-called "minor" taxa. I would suggest that at least the moths, Diptera, 0rthoptera Hymenoptera, Ephemeroptera, Plecoptera and Trichoptera should be gradually phased into the long-term database about the biodiversity of insects on the CHEP Project area. We know essentially nothing about these major groups on the Project area, not even a remote estimate of the number of species present in the major families of these taxa.

Summary

A relatively limited inventory of butterflies and dragonflies and damselflies was conducted on four dates in 2003: 20 May, 6th and 9th June and 8 Oct. on all four farm properties of the CHEP area. No species were new to the Project area.

13 species of adult butterflies were recorded, one was a skipper, the common spring species, the Hobomok S. Compared to previous seasons, especially 2001 and 2002 when none were reported, the Mustard White was very common and widespread. It was even found flying over the grassy field of Guthrie Farm well removed from the woodland/field edges.

13 species of odonata were recorded, 12 as adults and one only in the exuviae stage, the Hudsonian Whiteface. Nine were dragonflies and four

were damselflies. The latter included the relatively rare (for the Project area) Taiga Bluet and an unidentified species of bluet (*Enallagma* sp.)

In May and especially in June there was a major emergence of dragonflies from Guthrie Pond and undoubtedly from other unverified aquatic sites on or near the Project area. 47 exuviae were collected from cattails around Guthrie Pond and 45 were of one species, the Common Emerald. Only one of the exuviae was another species, the Hudsonian Whiteface. Several freshly eclosed tenerals were seen flying rapidly from Guthrie Pond, almost certainly the Common Emerald, though none were netted.

Throughout the Project area, very fresh (teneral and/or subadult) dragonflies were recorded, most were along a woodland trail in the Bancroft woods.

Miscellaneous observations of amphibia in June included: 1) the discovery of the American toad apparently breeding in a flowing water (lotic) site of Upper Isham Brook a most unusual breeding site for this species and 2) that of many large tadpoles of presumably the Green Frog near the surface of Guthrie Pond.

Table 1. Butterflies of Guthrie (G) and Bancroft (B) Farms, Lincoln Twp., Addison Co., Vt.-2003.

SPECIES (names after Layberry et al, 1998)	COMMON NAME	G - open fields	G corner marsh	G woodland swamp/ marsh	G wood-land	G totals (sites) n=4	B field (f) woods (w)	Grand Total (no.sites /sp.) G & B
Battus canadensis	Canadian T. Swallowtail	6				1		1
Pieris napi	Mustard White	5,6	5	5	5	4	5f,6w	5
Pieris rapae	Cabbage White			10		1		1
Colias eurytheme	Orange Sulphur	10				1		1
Colias philodice	Clouded Sulphur	5,10				1		1
Celastrina ladon	Spring Azure	5			5	2	5f	3
Nymphalis milberti	Milbert's Tortoise Shell	6				1		1
Polygonia sp.	Anglewings			10?		1		2
Vanessa virginiensis	American Lady	5,6				1	5f	2
Danaus archippius	Monarch	10		10		2		2
SKIPPERS								
Poanes hobomok	Hobomok Skipper					0	6w	1
	Total spp. verified +?/site	8	1	3+1?	2		3+ 1?	
	% species verified(n=10)	80	10	30	20		30	

Table 2. Butterflies of Pierce and Wells Farms, Lincoln Twp., Addison Co., Vt.-2003.

SPECIES (names after Layberry et al, 1998)	COMMON NAME	Pierce Fields upper (u) lower (l)	Pierce Ponds woods(w) open (0)	Pierce-riparian zone: U. Isham Br.	Pierce Beaver Meadow and Swamp: U. Isham Br.	Pierce-lowland wooded marsh/ swamp & woods (w)	Pierce Totals (by Sites)	Wells-swamp to nw-field edge	Wells field (f) woods (w)	Grand Totals (no. sites/ sp. Pierce & Wells
Battus canadensis	Canadian T. Swallowtail						0	6	6 f,w	2
Pieris napi	Mustard White					5 w	1			1
Pieris rapae	Cabbage White			5			1			1
Colias philodice	Clouded Sulphur			5,10			1		6 f	2
Celastrina ladon	Spring Azure	5 l	5 w	5,6	6		4			4
Glaucopsyche lygdamus	Silvery Blue						0		6 f	1
Coenonympha tullia	Common Ringlet						0		6 f	1
Danaus p. plexippus	Monarch				10		1			1
	Total species verified /site	1	1	3	2	1		1	4	8
	% species verified (n=8)	12.5	12.5	37.5	25	12.5		12.5	50	

Table 3. Odonata of Guthrie and Bancroft Farms, Lincoln, Twp., Addison Co., Vt. 2003

SPECIES	COMMON NAME	Guthrie-pond & immedi-ate environs	Guthrie -open fields	Guthrie -corner marsh to sw	Guthrie - woodland swamp/ marsh	Guth. wood land	Guth.- wooded brook	Guthrie totals-of 6 sites	Ban. field ('03) field (f) woods (w)	**Grand Tot. G&B of 7 sites/ sp.**
Lestes congener	Spotted Spreadwing	10						1		1
Coenagrion resolutum	Taiga Bluet	6						1		1
Enallagma sp.	Bluet	6						1		1
Ishnura verticalis	Eastern Forktail	6						1		1
Aeshna sp.	Darners	10	10					2		2
Aeshna umbrosa	Shadow Darner			10				1		1
Anax junius	Common Green Darner	6		10				2		2
Cordulia shurtleffi	American Emerald	6						1		1
Epitheca canis	Beaverpond Baskettail		5					1	5?f6w	2
Ladona julia	Chalk-fronted L.							0	6w	1
Plathemis lydia	Common Whitetail							0	6w	1
Sympetrum vicinum	Yellow-legged M.			10				2		2
Total species verified +?/site		5+2?	1+1?	3	0	0			3	
	% species verified(n=10)	50	10	30	0	0			30	

Table 4. Odonata of Pierce and Wells Farms, Lincoln, Twp., Addison Co., Vt. 2003.

SPECIES	COMMON NAME	Pierce fields upper (u) lower (L)	Pierce Ponds-woods (w) open area (o)	Pierce Upper Isham Br.	Pierce Beaver Marsh Area-Upper Isham Br.	Pierce Beaver Dam Upper Isham Br.	Pierce Lower Woodland Marsh	Pierce Totals - of 6 sites	Wells Pond & Open Fields	Wells Site Totals	Grand Totals Pierce & Wells of 7 sites
Lestes congener	Spotted Spreadwing					10		1		0	1
Aeshna sp.	Darners				10			1		0	1
A. umbrosa	Shadow Darner					10		1		0	1
Libellula quadrimaculata	Four-spotted Skimmer	5 L						1		0	1
Plathemis lydia	Common Whitetail							0	6	1	1
Sympetrum vicinum	Yellow-legged M.				10	10		2		0	2
	Total species + ?/site	1	0	0	2	3	0		1		
	% species verified(n=5)	20	0	0	40	60	0		20		