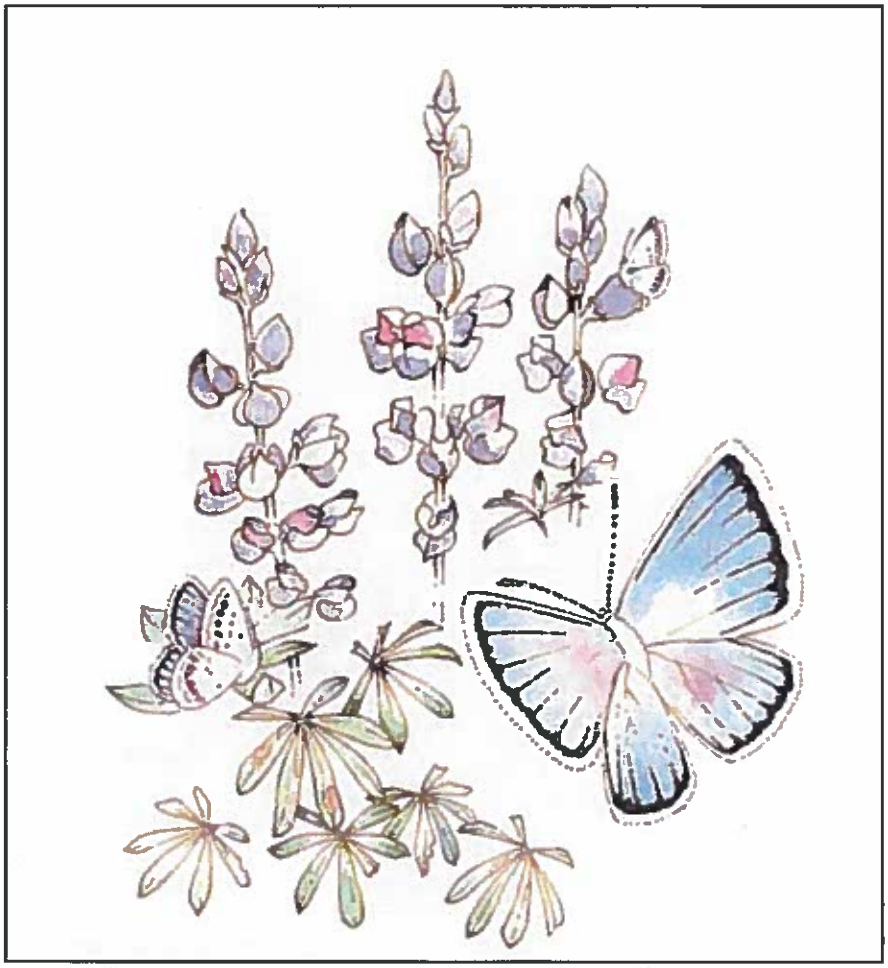
Attachment 2

U.S. Fish & Wildlife Service

Karner Blue Butterfly Recovery Plan

(Lycaeides melissa samuelis)



September 2003

Department of the Interior
U.S. Fish & Wildlife Service
Great Lakes - Big Rivers Region (Region 3)
Fort Snelling, Minnesota

KARNER BLUE BUTTERFLY
(Lycaeides melissa samuelis)

RECOVERY PLAN

September 2003

Prepared by the
Karner Blue Butterfly Recovery Team

for

Region 3
U.S. Fish and Wildlife Service
Fort Snelling, Minnesota

Approved: _____

Acting Robyn Thorson, Regional Director, Region 3
U.S. Fish and Wildlife Service

Date: August 25, 2003

APPENDIX C

PLANTS USED FOR NECTAR BY ADULTS

Table C1 provides a list of all of the nectar plants reported to be used by Karner blue adults. Some of these records may be based on single observations of one individual, while others represent hundreds of observed uses. These records are based on observing at least one adult to probe a flower with its mouth parts. In the majority of cases, feeding was further confirmed by observing the adult to remain with its mouth parts in a single flower or floret for some period of time after initial probing.

Table C1. Nectar plant species reported to be used by the Karner blue butterfly. Scientific names follow Ownby and Morley (1991), Gleason and Cronquist (1991) or Swink and Wilhelm (1994).

Scientific name	Common name	Location	Reference
----------First brood adult nectar sources----------			
----------Herbaceous species----------			
Achillea millefolium L.	Common yarrow	WI, IN	2,7,14,15
Anenome cylindrica Gray	Thimbleweed	WI,IN	7,15
Arabis lyrata L.	Sand-cress	IN,MN,ON,WI	2,5,7,8,10,9,14,15
Arenaria serpyllifolia L.	Thyme-leaved sandwort	ON	10
Baptisia bracteata var. *glabrescens* (Larisey) Isely (*leucophaea*)	Prairie wild indigo	WI	2,14
Berteroa incana (L.) DC.	Hoary alyssum	WI	2,7
Centaurea biebersteinii (*maculosa*) DC.	Spotted knapweed	WI	7
Cerastium sp.	Chickweed	WI	7
Chrysanthemum leucanthemum L.	Ox-eye daisy	WI	7
Commandra umbellata (L.) Nutt.	Bastard toadflax	MI	11,13
Coreopsis lanceolata L.	Lance-leafed coreopsis	IN	8,15
Coreopsis tripteris *L.*	Tall coreopsis	IN	15
Erigeron strigosus Muhl.	Daisy fleabane	WI	2
Euphorbia corollata L.	Flowering spurge	WI,IN	9,15
Euphorbia podperae (*esula*) Croizat	Leafy spurge	WI	7,9
Fragaria virginiana Duchesne	Strawberry	NY,WI,IN	3,7,15
Gaylussacia baccata (Wang.) K. Koch	Huckleberry	IN	15
Geranium maculatum L.	Wild geranium	ON	10
Hedyotis (Houstonia) longifolia (Gaetrn.) Hook.	Longleaved houstonia	MN,WI	5,7,9,14
Helianthemum canadense (L.) Michx.	Frostweed	NH,IN	1,15
Hieracium aurantiacum L.	Orange hawkweed	WI	2,7,9,14
Hieracium sp.	Hawkweed	ON,NH,WI	1,2,10
Krigia biflora (Wlt.) Blake	Two-flowered Cynthia	WI	2,14
Liatris Spp.	Blazing star	IN	15
Lithospermum canescens (Michx.) Lehm.	Hoary puccoon	IN	15
Lithospermum caroliniense (Walt.) MacM.	Hairy puccoon	ON,WI,IN	2,10,15
Lupinus perennis L.	Wild lupine	MI,NH,OM,WI,IN	1,2,7,9,10,11,14,15
Medicago lupulina L.	Black medic	WI	2,7
Melilotus officinalis (L.) Pallas	Yellow sweet clover	IN,WI	2,7,8

Table C1. (continued)

Scientific name	Common name	Location	Reference
Pedicularis canadensis L.	Lousewort	WI	2,14
Phlox pilosa L.	Downy phlox	IN	8,15
Potentilla recta L.	Rough-fruited cinquefoil	WI	2
Potentilla simplex Michx.	Common cinquefoil	WI,MI,IN	2,7,13,14,15
Potentilla sp.	Cinquefoil	MI,NY	3,11
Rosa carolina L.	Carolina rose	IN	15
Rumex acetosella L.	Sheep sorel	WI	2
Senecio pauperculus Michx.	Ragwort	WI	7
Senecio sp.	Ragwort	WI	2,9
Smilacina racemosa (L.) Desf.	False spikenard	WI	2,7
Smilacina stellata (L.) Desf.	Star-flow. fals. sol. seal	WI	2,14
Solidago sciaphila Steele	Cliff goldenrod	WI	7
Tephrosia virginiana (L.) Pers.	Goat's rue	NY	3
Tradescantia ohiensis Raf.	Spiderwort	IN	15
Trifolium hybridum L.	Alsike clover	WI	2,14
Trifolium pratense L.	Red clover	WI	7
Trifolium repens L.	White clover	WI	2
Viccia villosa Roth.	Hairy vetch	WI	2
Viola pedata L.	Bird foot violet	NY,WI	2,3,13
Zizia aurea (L.) Koch	Golden alexanders	WI	2
----------Woody species----------			
Amelanchier sp.	Juneberry	ON	10
Ceanothus herbaceus (ovatus) Raf.	Red root	WI	7
Ceanothus sp.	New jersey tea	WI	2
Physocarpus opulifolius (L.) Maxim.	Common ninebark	WI	7
Prunus sp.	Wild plum	NY	3
Rubus allegheniensis Porter	Blackberry	WI	7
Rubus flagellaris Willd.	Dewberry	IN,MI,WI	7,6,8,13,15
Rubus sp. or sPP. (IN)	Bramble	IN,MI,MN,WI	2,5,8,11,9,14,15
Salix humilis Marsh.	Prairie willow	WI	2, 7
Vaccinium sp.	Blueberry	NY,IN	3,15
Vitis riparia Michx.	River grape	MN	5
----------Second brood adult nectar sources----------			
----------Herbaceous species----------			
Achillea millefolium L.	Common yarrow	IN,MI,MN,WI	2,5,7,8,11,14
Amorpha canescens Pursh	Lead plant	WI	2,7,9,14
Apocynum androsaemifolium L.	Spreading dogbane	NH,NY	1,12
Arabis lyrata L.	Sand-cress	IN,WI	2,7,8,14
Asclepias incarnata L.	Swamp milkweed	IN	15
Asclepias syriaca L.	Common milkweed	NH,NY,WI	2,7,12
Asclepias tuberosa L.	Butterfly-weed	IN,MI,MN, NY,ON,WI	2,3,4,5,6,7, 8,10,11,13,15
Asclepias verticillata L.	Whorled milkweed	MI,WI,IN	2,7,8,11,9,13,15
Aster sp.	Aster	WI	2,13
Aureolaria pedicularia (L.) Raf.	Fern-leaved false foxglove	WI	2
Aureolaria sp.	False foxglove	WI	2,13
Berteroa incana (L.) DC.	Hoary alyssum	NY,WI	2,4

Table C1. (continued)

Scientific name	Common name	Location	Reference
Campanula rotundifolia L.	Harebell	MN,WI	1,2,9,14
Centaurea biebersteinii (maculosa) DC.	Spotted knapweed	MI,NY,WI	2,3,4,7,11,13,14
Chrysanthemum leucanthemum L.	Ox-eye daisy	WI	7
Coreopsis lanceolata L.	Lance-leaved coreopsis	MI	11
Coreopsis palmata Nutt.	Stiff tickseed	WI	7,9,14
Coreopsis sp.	Coreopsis	WI	2
Dianthus armeria L.	Deptford pink	MI	11
Erigeron annuus (L.) Pers.	Daisy fleabane	MI,MN	5,11
Erigeron canadensis		WI	9
Erigeron strigosus Muhl.	Daisy fleabane	WI,IN	2,7, 9,15
Erigeron sp.	Fleabane	IN,WI,MI	2,8,13,14
Euphorbia corollata L.	Flowering spurge	IN,MI,MN,WI	1,2,5,6,7,8,11,13, 14,15
Euphorbia podperae (esula) Croizat	Leafy spurge	WI	2,7
Euthamia graminifolia (*Solidago graminifolia*) (L.) Nutt	Grass-leaved goldenrod	NH,WI	2,12,14
Froelichia floridana (Nutt.) Moq.	Cottonweed	WI	7
Galium sp.	Bedstraw	WI	2,14
Gnaphalium obtusifolium L.	Sweet everlasting	MN,WI	1,2,5,9,14
Hackelia deflexa (Wahlenb.) Opiz	Stickseed	MN	5
Hedyotis (Houstonia) longifolia (Gaetrn.) Hook.	Longleaved houstonia	WI	2,14
Helianthemum canadense (L.) Michx.	Frostweed	WI	9
Helianthus divaricatus L.*	Woodland sunflower	IN,MI	8,11,15
Helianthus occidentalis Riddell	Western sunflower	MN,WI,IN	2,5,7,9,14,15
Helianthus sp.	Sunflower	NH,NY,MI,WI	2,11,12,14
Hieracium aurantiacum L.	Orange hawkweed	WI	2,7,9,14
Hieracium pilosella L.	Mouse ear hawkweed	MI	11
Hieracium sp.	Hawkweed	MI	11
Hypericum perforatum L.	Common St.John's wort	MI	11
Krigia biflora (Walt.) Blake	Two-flowered Cynthia	WI	2,14
Lespedesa capitata Michx.	Bush clover	WI	2,14
Liatris aspera Michx.	Rough blazing star	MI,WI	2,6,7,11,9,14
Liatris cylindracea Michx.	Dwarf blazing-star	ON,WI	2,7,9,12,14
Liatris sPP.	Blazing-star	IN	15
Lilium philadelphicum L.	Wood lily	NH	1
Linaria canadensis (L.) Dum.-Cours.	Old-field toad flax	WI	2
Linaria vulgaris Hill	Butter-and-eggs	WI	2
Lithospermum caroliniense (Walt.)MacM	Hairy puccoon	WI	2
Lobelia spicata Lam.	Pale-spike lobelia	WI	7
Lotis corniculatus L.	Birdsfoot trefoil	MI,WI	2,11,14
Lupinus perennis L.	Wild lupine	NY,WI	2,12,14
Lycopus americanus Muhl.	Water-horehound	IN	15
Lysimachia sp.	Loosestrife	WI	2,14
Lythrum alatum Pursh.	Winged loosestrife	IN	15
Medicago lupulina L.	Black medic	WI	2,7,9
Medicago sativa L.	Alfalfa	WI	2
Melilotus alba Medic.	White sweet clover	IN,MN,WI	2,5,7,8,9,14,15
Melilotus officinalis (L.) Pallas	Yellow sweet clover	MN,WI	2,5,7
Monarda fistulosa L.	Wild bergamot	IN	8,9,14,15
Monarda punctata L.	Horsemint	IN,MI,MN,NY, ON,WI	2,3,4,5,6,7, 8,9,10,11,14,15

Table C1. (continued)

Scientific name	Common name	Location	Reference
Oenothera sp.	Evening primrose	WI	2,13
Petalostemon candidum (Willd.) Michx.	White prairie clover	WI	2,7,9
Petalostemon purpureum (Vent.) Rydb.	Purple prairie clover	WI	2,7
Phlox pilosa L.	Downy phlox	IN	15
Polygala polygama Walt.	Racemed milkwort	MI	11
Polygonum sp.	Knotweed	WI	2,14
Potentilla recta L.	Rough-fruited cinquefoil	IN	15
Potentilla simplex Michx.	Common cinquefoil	WI	2,14
Pycanthemum virginianum L.	Mountain-mint	IN	15
Rosa carolina L.	Carolina rose	IN	15
Rosa sp.	Wild rose	WI	2,14
Rudbeckia hirta (serotina) L.	Black-eyed susan	MI, MN,ON,WI,IN	2,5,7,9,10,11,14,15
Saponaria officinalis L.	Soapwort	NY,IN	3,15
Scutellaria epilobiifolia	Marsh skullcap	IN	15
Smilacina stellata (L.) Desf.	Star-flow. fals. sol. seal	WI	2,14
Solidago ptarmicoides (Nees) Boivin (*Aster ptarmicoides*)	Upland white aster	WI	2,9
Solidago speciosa Nutt.	Showy goldenrod	WI,IN	13,15
Solidago sp.	Goldenrod	IN,NH,WI	1,2,8,14
Spiraea tomentosa L.	Meadowsweet	WI	14
Talinum rugospermum Holz.	Fameflower	WI	2
Tephrosia virginiana (L.) Pers.	Goat's rue	IN	8,14,15
Tradescantia ohiensis Raf.	Spiderwort	IN	15
Tradescantia virginiana L.*	Virginia spiderwort	MI	11
Trifolium arvense L.	Rabbit-foot clover	WI	2,14
Trifolium hybridum L.	Alsike clover	WI	2,14
Trifolium pratense L.	Red clover	WI	2,7,14
Trifoliium repens L.	White clover	WI	2,7,14
Vicia villosa Roth.	Hairy vetch	WI	2,14
	----------Woody species----------		
Ceanothus americanus L.	New Jersey tea	IN,NH,NY,ON,WI	1,2,3,4,8,10,14,15
Ceanothus herbaceus (ovatus) Raf.	Red root	ON	10
Rhus copallinia	Winged sumac	IN	14

References: 1= Bidwell, in Helmbolt and Amaral 1994, 2 = Bleser 1992, 3 = Dirig 1976, 4 = Fried 1987, 5 = Lane, pers. comm. 1994, 6 = Lawrence 1994, 7 = Leach 1993, 8 = Martin 1994, 9 = Maxwell and Givnish 1994, 10 = Packer 1987, 11 = Papp 1993, 12 = Schweitzer, pers. comm. 1994, 13 = Sferra and Darnell 1993, 14 = Swengel and Swengel 1993, 15 = Grundel and Pavlovic 2000.

LITERATURE CITED

Bleser, C.A. 1992. Status survey, management and monitoring activities for the Karner blue butterfly *(Lycaeides melisa samuelis)* in Wisconsin 1990-1992. Report submitted to the U.S. Fish and Wildlife Service, Fort Snelling, Minnesota, by the Wisconsin Department of Natural Resources, Bureau of Endangered Resources, Madison, Wisconsin. 88 pp.+ appendices.

Dirig, R. Karner's famous blue butterfly. *In* Rittner, D. (ed.), Pine Bush-Albany's Last Frontier. Pine Bush Historic Preservation Project, Albany, New York. 1976. pp. 197-210, 250-252.

Fried, C. S. September1987. Dispersal of the Karner blue butterfly (*Lycaeides melissa samuelis* Nabokov) in the Albany Pine Bush. Report submitted to the Endangered Species Unit of the NewYork State Department of Environmental Conservation.

Gleason, H.A. and A. Cronquist. 1991. Manual of Vascular Plants of the Northeastern United States and Adjacent Canada, second edition. The New York Botanical Garden. New York.

Grundel, Ralph and N.B. Pavlovic. 2000. Nectar plant selection by the Karner blue butterfly (Lycaeides melissa samuelis) at the Indiana Dunes National Lakeshore. American Midland Naturalist. 144:1-10.

Helmbolt, K. M. and M. Amaral. Status of the Karner blue butterfly in New Hampshire. *In* Andow, D. A., R. Baker, and C. Lane (eds.), Karner Blue Butterfly: A Symbol of a Vanishing Landscape. St. Paul: Minnesota Agricultural Experiment Station. 1994. (Miscellaneous Publication Series). pp. 123-128.

Lawrence, W. S. Karner blue butterfly populations in the Allegan State Game Area, Michigan. *In* Andow, D. A., R. Baker, and C. Lane (eds.), Karner blue butterfly: A symbol of a vanishing landscape. St. Paul: Minnesota Agricultural Experiment Station. 1994. (Miscellaneous Publication Series). pp. 53-62.

Leach, M. 1993. Status and distribution of the Karner blue butterfly at Fort McCoy, Wisconsin: Final report on a two-year status survey. Unpublished report for the Natural Resources Management Division, Fort McCoy Military.

Martin, M. Karner blue butterfly in Indiana: 1990 status survey for the U.S. Fish and Wildlife Service. *In* Andow, D. A., R. Baker, and C. Lane (eds.), Karner blue butterfly: A symbol of a vanishing landscape. St. Paul: Minnesota Agricultural Experiment Station. 1994. (Miscellaneous Publication Series). pp. 97-105.

Maxwell, J. and T. Givnish. 1994. Research on the Karner blue butterfly at Fort McCoy, Wisconsin: Progress report for the 1994 field season. Report to the US Fish and Wildlife Service and U.S. Department of Defense, Fort McCoy, Fort McCoy, Wisconsin.

Ownby, G. B .and T. Morley. 1991. Vascular Plants of Minnesota: a Checklist and Atlas, University of Minnesota Press, Minneapolis.

Packer, L. The status of two butterflies, Karner blue *Lycaeides melissa samuelis*) and frosted elfin (*Incisalia irus*), restricted to oak savanna in Ontario. *In* G.M. Allen, P.F.J. Eagles, and S.D. Price (eds.), Conserving Carolinian Canada. Waterloo, Ontario, Univ. Waterloo Press. 1987. pp. 253-271.

Papp, C. 1993. Habitat study of the endangered Karner blue butterfly (*Lycaeides Melissa samuelis* Nabokov) in Michigan oak savanna. Preliminary report submitted to the Department of Natural Resources, Wildlife Division, Lansing, Michigan.

Sferra, N.J., D.N. Ewert, C.A. Clampitt, H.E. Ballard, Jr., J.M. Aguiar and T. Darnell. 1993. Management of oak savanna and oak barrens habitat in Newaygo and Muskegon Counties, Michigan, for Karner blue butterflies *(Lycaeides melissa samuelis)* and other oak savanna invertebrates. Final Results. The Nature Conservancy, Unpublished Report. 25 pp.

Swengel, A. and S. Swengel. 1993. Observations of Karner blues and the barrens butterfly community in Wisconsin. Manuscript (December 1993), 909 Birch Street, Baraboo, Wisconsin. 36 pp. + appendices.

Swink, F. and G. Wilhelm. 1994. Plants of the Chicago region, 4th ed. Indiana Academy of Sciences, Indianapolis. 921 p.