



United States
Department of
Agriculture

Forest Service

**Northeastern
Research Station**

General Technical
Report NE-257



Organisms of the Hubbard Brook Valley, New Hampshire

Abstract

Lists the organisms, both plant and animal, that have been identified by scientists engaged in multidisciplinary ecological research in the Hubbard Brook Valley, New Hampshire, during the past three decades. The Valley encompasses the Hubbard Brook Experimental Forest, Mirror Lake, and other areas within the White Mountain region of Grafton County. The species lists included in this report are relatively complete for vascular plants, amphibians, birds, fish, mammals, phytoplankton, and zooplankton, and partially complete for insects, molluscs, and nonvascular plants.

The Compilers

RICHARD T. HOLMES is professor of environmental biology and professor of biological sciences with the Department of Biological Sciences at Dartmouth College, Hanover, New Hampshire.

GENE E. LIKENS is director and president of the Institute of Ecosystem Studies, Millbrook, New York.

Manuscript received for publication 12 January 1998

Published by:
USDA FOREST SERVICE
5 RADNOR CORP CTR SUITE 200
RADNOR PA 19087-4585

March 1999

For additional copies:
USDA Forest Service
Publications Distribution
359 Main Road
Delaware, OH 43015
Fax: (740)368-0152

Contents

Introduction	1
Hubbard Brook Ecosystem Study	1
Hubbard Brook Experimental Forest	1
Mirror Lake	2
Organisms of Forested Watersheds, including Streams and Wetlands, of Hubbard Brook Valley	3
Bryophytes	3
Liverworts	3
Mosses	3
Vascular Plants	6
Pteridophytes	6
Gymnosperms	7
Angiosperms	8
Insects	14
Molluscs	17
Other Invertebrates	17
Fish	17
Amphibians	17
Reptiles	17
Birds	18
Mammals	20
Organisms in Mirror Lake	21
Hydrophytes	21
Epipelagic Algae	22
Phytoplankton	22
Benthic Micro- and Macroinvertebrates	27
Zooplankton	29
Fish	30
Amphibians	30
Reptiles	30
Acknowledgments	31
References	31
Appendix: Primary Sources for the Organisms Listed in This Report	32

Organisms of the Hubbard Brook Valley, New Hampshire

Compiled by:

Richard T. Holmes and Gene E. Likens

Introduction

This report lists the organisms, both plant and animal, that are found within the Hubbard Brook Valley in New Hampshire.¹ The species lists are relatively complete for vascular plants, amphibians, birds, fish, mammals, photoplankton, and zooplankton, and partially complete for insects, molluscs, and nonvascular plants. The Hubbard Brook Valley consists of the watershed of Hubbard Brook, from its junction with the Pemigewasset River to its headwaters within the White Mountains. The Valley is situated within the townships of Thornton and Woodstock in Grafton County. This area consists primarily of the Hubbard Brook Experimental Forest, Mirror Lake, and several private landholdings.

The organisms included in this report are divided into species that inhabit the forested watersheds, including streams and wetlands, of Hubbard Brook Valley and those that are found in nearby Mirror Lake. In several instances, the same species are found in both regions. Sources for the species listed are identified in the References sections and/or the Appendix.

Hubbard Brook Ecosystem Study

The Hubbard Brook Experimental Forest (Fig. 1), the bowl-shaped drainage area of Hubbard Brook, was established in 1955 by the USDA Forest Service as a major center for hydrologic research in New England. In 1963, the scope of this research was expanded with the initiation of the Hubbard Brook Ecosystem Study, which pioneered the use of small watersheds in multidisciplinary studies of northern hardwood forest ecosystems. In addition to monitoring long-term trends in atmospheric and streamwater conditions, scientists are examining chemical and meteorological data to determine the status of and trends in dry deposition, air quality, and the biota of northern hardwood ecosystems.

The Hubbard Brook Ecosystem Study, which includes cooperative studies by researchers with the Forest Service and other government agencies, Dartmouth College, Cornell University, Syracuse University, Yale University, the Institute of Ecosystem Studies, and other public and private organizations, is generating a wealth of information on the biology, hydrology, geology, chemistry, and human disturbance of forest and freshwater ecosystems throughout the HBEF and adjacent Mirror Lake. Examples include the longest continuous record of precipitation chemistry in North

America as well as one of the longest quantitative records of bird population abundance in northeastern forests.

Since 1955, research at the HBEF has resulted in more than 1,300 published papers as well as numerous books and monographs. During the last four decades, hundreds of students have been trained in ecology and ecosystem science at Hubbard Brook. As of 1998, this training has produced 65 doctoral dissertations, 34 master's theses, and 22 undergraduate honors theses.

Hubbard Brook Experimental Forest

The 3,160-ha Hubbard Brook Experimental Forest (43°56'N latitude, 71°45'W longitude) ranges in elevation from 222 to 1,015 m. The climate is humid-continental with short, cool summers and long, cold winters. The average monthly temperature is 19°C in July and -9°C in January. There are about 140 frost-free days; the growing season for trees extends from the end of May until mid-October. The average minimum daily relative humidity is about 60 percent; average annual precipitation is 139 cm with a winter snowpack of 1.5 m.

The bedrock of the HBEF consists of granitic rocks of the Kinsman Granodionite Formation in the western portion and highly metamorphosed sedimentary rocks of the Rangeley Formation in the eastern portion. Soils are primarily spodosols developed in acidic glacial till. A common soil type is the Becket series, a well-drained sandy loam; depth to bedrock ranges from 0 to 3 m.

Within the HBEF are nine small watersheds (12 to 76 ha) equipped with stream gaging stations and precipitation collectors that are used to study the movement of water and chemicals through this ecosystem. This equipment also is used in studies of the impact of human disturbances such as forest cutting, air pollution, changes in land use, animal populations, and climate. The HBEF contains numerous headwater streams (temperature range: 0°C in winter and 18°C in summer). The stream water is generally acidic (pH 4.9) and high in dissolved oxygen. Average annual streamflow is 81 cm, of which about 50 percent occurs during March through May.

The forest on the HBEF is dominated by uneven-aged, second-growth northern hardwoods. Forest vegetation varies with slope, aspect, soil depth, and other site and environmental characteristics. Organisms that inhabit this ecosystem range from microorganisms in the soil to numerous species of amphibians, birds, fish, insects, mammals, and reptiles.

¹Update of: Likens, G.E., ed. 1971. **A checklist of organisms for the Hubbard Brook ecosystems.** Unpublished report from Section of Ecology and Systematics, Cornell University, Ithaca, NY.

Mirror Lake

Although outside the boundaries of the HBEF, the 15-hectare Mirror Lake has been an integral part of the Hubbard Brook Ecosystem Study since the 1960's. This oligotrophic lake has a maximum depth of 11 m (pH 5.4 to 6.5) and drains into Hubbard Brook and eventually the nearby Pemigewasset River. In most years, Mirror Lake is covered by ice and snow from early December to mid-April. About 22 percent of the water that enters the lake is from precipitation; the remainder is from surface runoff and

groundwater. The average temperature of the surface water ranges from 0°C to 25°C. The total drainage area (85 ha excluding the lake) is divided about equally into three subwatersheds, the vegetation of which is similar to that on the HBEF. Organisms that inhabit Mirror Lake range from bacteria, hydrophytes, phytoplankton, and zooplankton to amphibians, fish, and reptiles (turtles).

Additional information on the Hubbard Brook Experimental Forest, Mirror Lake, or the Hubbard Brook Ecosystem Study, is available on the Internet at: <http://www.hbrook.sr.unh.edu>.

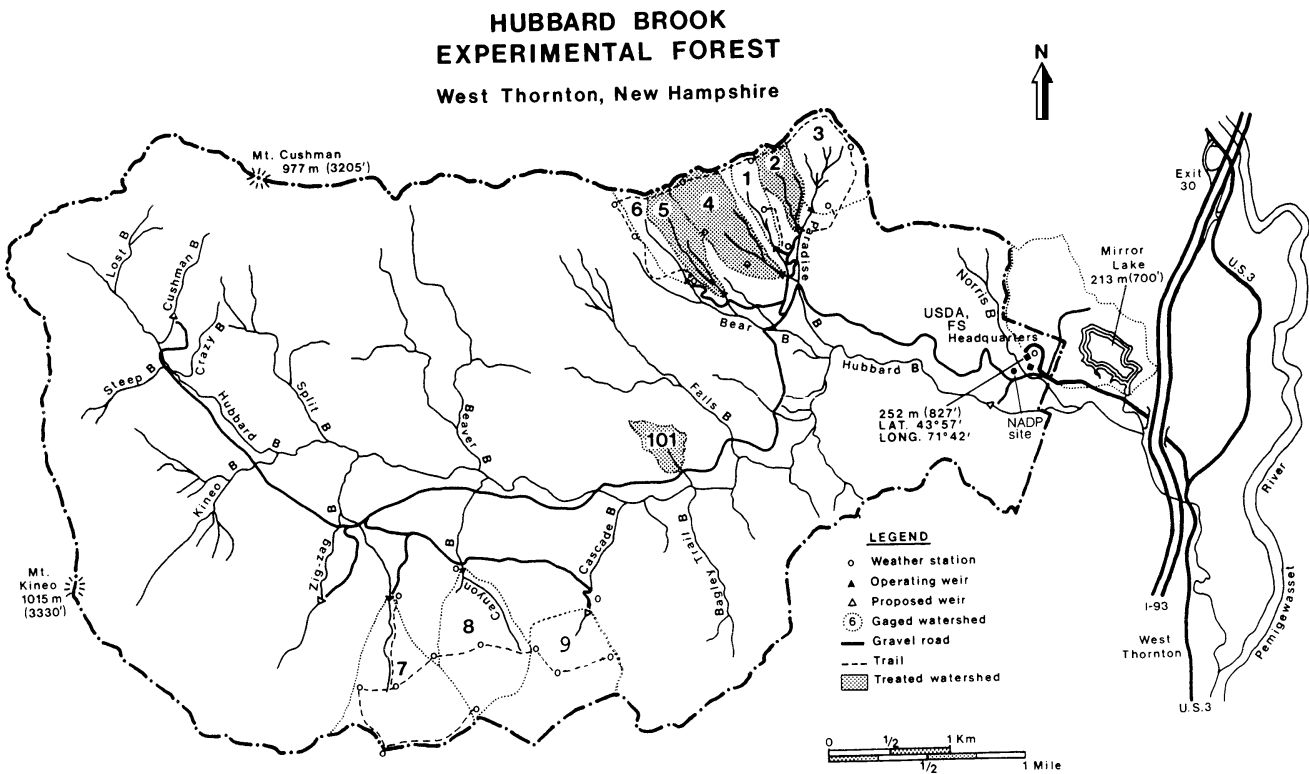


Figure 1.—The Hubbard Brook Experimental Forest was established in 1955 by the USDA Forest Service as a major center for hydrologic research in New England.

Organisms of Forested Watersheds, Including Streams and Wetlands, of the Hubbard Brook Valley

BRYOPHYTES

LIVERWORTS

(Nomenclature for liverworts follows Stotler and Crandall-Stotler 1977)

Aneuraceae

Riccardia latifrons Lindb. (698)^a

Blasiaceae

Blasia pusilla L. (817)

Blepharostomaceae

Blepharostoma trichophyllum (L.) Dum. (571)

Calypogeiaceae

Calypogeia intergristipula Steph. (820)
C. muelleriana (Schiffn.) K. Müll. (1395)
C. trichomanis (L.) Corda. (1388)

Cephaloziaceae

Cephalozia bicuspidata (L.) Dum. (710)
C. lunulifolia (Dum.) Dum. (698)
Nowellia curvifolia (Dicks.) Mitt. (832)

Conocephalaceae

Conocephalum conicum (L.) Lindb. (1042)

Gymnomitriaceae

Marsupella emarginata (Ehrh.) Dum. (699)

Jubulaceae

Frullania eboracensis Gottsche (746)
F. undet. spp. to Norton Miller (1403)
F. tamarisci subsp. *asagrayana* (Mont.) Hatt. (825)
Jubula pennsylvanica (Steph.) Evans (1392)

Jungermanniaceae

Jamesoniella autumnalis (DC.) Steph. (828)
Lophozia capitata (Hook.) Macoun. (747)
L. ventricosa (Dicks.) Dum. (1381)
Solenostoma gracillimum (Smith) Schust. (851)

Lepidoziaceae

Bazzania denudata (Torrey ex Gott. et al.) Trev. (1393)
B. tricrenata (Wahl.) Trev. (1041)
B. trilobata (L.) Gray. (819)
Lepidozia reptans (Dum.) Dum. (829)

Lophocoleaceae

Chiloscyphus polyanthos (L.) Corda. (1396)
Lophocolea heterophylla (Schrad) Dum. (566)

Marchantiaceae

Preissia quadrata (Scop.) Nees. (1116)

Pallaviciniaceae

Pallavicinia lyellii (Hook) Carruth. (748)

Pelliaceae

Pellia epiphylla (L.) Corda. (707)
P. neesiana (Gott.) Limpr. (1055)

Plagiochilaceae

Plagiochila porelloides (Torr.) Lindenb. (833)

Porellaceae

Porella platyphylloidea (Schwein.) Lindb. (836)

Ptilidiaceae

Ptilidium pulcherrimum (L.) Hampe. (840)

Radulaceae

Radula complanata (L.) Dum. (843)

Scapaniaceae

Diplophyllum apiculatum (Evans) Steph. (821)
Scapania nemorea (L.) Grolle. (849)
S. undet. spp. to Norton Miller (1402)
S. undulata (L.) Dum. (846)

MOSSES

(The nonmenclature for mosses follows Anderson et al. 1990).

Amblystegiaceae

Amblystegium serpens (Hedw.) B.S.G. (383)
Campylium chrysophyllum (Brid.) J Lange (1047)
C. hispidulum (Brid.) Mitt. (576)
Hygrohypnum eugyrium (B.S.G.) Loeske. (440)
H. luridum (Hedw.) Jenn. (1394)
H. montanum (Lindb.) Broth (442)
H. ochraceum (Turn ex Wils.) Loeske. (444)
Leptodictyum riparium (Hedw.) Warnst. (1058)
Sanionia uncinata (Hedw.) Loeske. (749)
Warnstorfia exannulata (Schimp. in B.S.G.) Loeske. (433)

Andreaeaceae

Andreaea rothii Web. & Mohr. (384)
A. rupestris Hedw. (385)

Anomodontaceae

Anomodon attenuatus (Hedw.) Hueb. (387)
A. rugellii (C. Müll.) Keissl. (388)
Haplohypnum triste (Ces. ex DeNot) Kindb. (718)

Aulacomniaceae

Aulacomnium palustre (Hedw.) Schwaegr. (394)

Bartramiaceae

Bartramia pomiformis Hedw. (396)
Philonotis fontana (Hedw.) Brid. (720)
Plagiopus oederiana (Sw.) Crum & Anderson (1115)

Brachytheciaceae

Brachythecium plumosum (Hedw.) B.S.G. (397)

B. reflexum (Stark.) Schimp. in B.S.G. (590)
B. salebrosum (Web. & Mohr) B.S.G. (721)
B. velutinum (Hedw.) Schimp. (704)
Bryhnia novae-angliae (Sull. & Lesq. ex Sull.) Grout. (406)

Bryaceae

Bryum lisae De Not. var. *cuspidatum* (Bruch. & Schimp in B.S.G.) Marg. (1371)
B. pseudotriquetrum (Hedw.) Gaertn. et al. (1113)
Pohlia annotina (Hedw.) Lindb. (989)
P. bulbifera (Warnst.) Warnst. (486)
P. escuriana (Sull.) Grout. (575)
P. nov Shaw pers. commun. (1053)
P. nutans (Hedw.) Lindb. (487)

Buxbaumiaceae

Diphyscium foliosum (Hedw.) Mohr. (429)

Climaciaceae

Climacium americanum Brid. (724)

Dicranaceae

Dicranella heteromalla (Hedw.) Schimp. (413)
D. rufescens (With.) Schimp. (703)
Dicranum flagellare Hedw. (420)
D. fulvum Hook. (750)
D. montanum Hedw. (421)
D. polysetum Sw. (423)
D. scoparium Hedw. (424)
D. viride (Sull. & Lesq. ex Sull.) Lindb. (426)
Oncophorus wahlenbergii Brid. (469)
Paraleucobryum longifolium (Hedw.) Loeske. (751)
Rhabdoweissia crispata (With.) Lindb. (722)

Ditrichaceae

Ditrichum lambiguum Best. (1390)
D. lineare (Sw.) Lindb. (573)
D. pusillum (Hedw.) Hampe. (572)
Saelania glaucescens (Hedw.) Broth. in Bomanss. & Broth. (1043)

Encalyptaceae

Encalypta ciliata Hedw. (1046)

Fissidentaceae

Fissidens dubius P. Beauv. (436)
F. osmundioides Hedw. (1037)

Fontinalaceae

Fontinalis dalecarlica Schimp. ex B.S.G. (752)

Grimmiaceae

Racomitrium aciculare (Hedw.) Brid. (506)
R. heterostichum (Hedw.) Brid. (507)
R. sudeticum (Funk) Bruch. & Schimp. in B.S.G. (510)
Schistidium apocarpum (Hedw.) Bruch. & Schimp. in B.S.G. (1382)

Hedwigiaceae

Hedwigia ciliata (Hedw.) P-Beauv. (719)

Hylocomiaceae

Hylocomiastrum umbratum (Hedw.) Broth. (445)
Hylocomium splendens (Hedw.) B.S.G. (447)
Pleurozium schreberi (Brid.) Mitt. (483)
Rhytidiadelphus squarrosus (Hedw.) Warnst. (723)

Hypnaceae

Callicladium haldanianum (Grev.) Crum. (408)
Herzogiella striatella (Brid.) Iwats. (438)
Hypnum fertile Sendtn. (449)
H. imponens Hedw. (725)
H. pallescens (Hedw.) P-Beauv. (452)
Isoptergiopsis muelleriana (Schimp.) Iwats. (455)
I. pulchella (Hedw.) Iwats. (1373)
Pseudotaxiphyllum distichaceum (Mitt) Iwats. (458)
P. elegans (Brid.) Iwats. (459)
Platydictya subtilis (Brid.) Crum. (580)
Platygyrium repens (Brid.) B.S.G. (479)
Ptilium crista-castrensis (Hedw.) DeNot. (497)
Pylaisiadelphus tenuirostris (Bruch. & Schimp. ex Sull.) Buck. (705)
Pylaisiella intricata (Hedw.) Grout. (501)
P. polyantha (Hedw.) Grout. (569)
P. selwynii (Kindb.) Crum et al. (578)

Leskeaceae

Leskea polycarpa Hedw. (462)
Leskeella nervosa (Brid.) Loeske. (463)

Leucobryaceae

Leucobryum glaucum (Hedw.) Angstr. ex Fr. (726)

Leucodontaceae

Leucodon brachypus Brid. var. *andrewsianus* Crum & Anderson. (727)

Mniaceae

Mnium hornum Hedw. (465)
M. thompsonii Schimp. (1380)
Plagiomnium ciliare (C. Müll.) T Kop. (471)
P. cuspidatum (Hedw.) T Kop. (472)
Rhizomnium magnifolium (Horik) T Kop. (513)
R. punctatum (Hedw.) T Kop. (514)

Neckeraceae

Homalia trichomanoides (Hedw.) B.S.G. (728)
Neckera pennata Hedw. (468)
Thamnobryum alleghaniense (C. Müll.) Nieuwl. (1045)

Orthotrichaceae

Amphidium lapponicum (Hedw.) Schimp. (1112)
A. mougeotii (B.S.G.) Schimp. (1036)
Orthotrichum sordidum Sull. & Lesq. ex Aust. (564)
Ulota coarctata (P-Beauv.) Hamm. (555)
U. crista (Hedw.) Brid. (559)
U. hutchinsiae (Sm.) Hammar. (1044)

Plagiotheciaceae

Plagiothecium cavifolium (Brid.) Iwats. (1054)
P. denticulatum (Hedw.) B.S.G. (474)
P. laetum Schimp. in B.S.G. (475)

Polytrichaceae

Atrichum angustatum (Brid.) B.S.G. (391)
A. crispum (James) Sull. (390)
A. oersteadianum (C. Müll.) Mitt. (392)
A. tenellum (Rohl.) B.S.G. (393)
A. undulatum (Hedw.) P-Beauv. (389)
Pogonatum pensilvanicum (Hedw.) P-Beauv. (485)
Polychastrum alpinum (Hedw.) GL Sm. (484)
Polytrichum commune Hedw. (492)
P. formosum Hedw. (493)
P. juniperinum Hedw. (494)
P. pallidisetum Funck. (496)
P. piliferum Hedw. (567)
P. strictum Brid. (729)

Pottiaceae

Bryoerythrophyllum recurvirostre (Hedw.) Chen (1385)
Tortella tortuosa (Hedw.) Limpr. (1378)

Pterigynandraceae

Heterocladium dimorphum (Brid.) B.S.G. (731)

Seligeriaceae

Blindia acuta (Hedw.) Bruch. & Schimp. in B.S.G. (1057)

Sematophyllaceae

Brotherella recurvans (Michx.) Fleisch. (402)
Sematophyllum marylandicum (C. Müll.) Britt. (518)

Sphagnaceae

Sphagnum affine Ren. & Card. (543)
S. angustifolium C. Jens. (735)

S. capillifolium (Ehrh.) Hedw. (542)
S. centrale C. Jens. (753)
S. cuspidatum Ehrh. (549)
S. fallax (Klingrr.) Klingrr. (530)
S. fimbriatum Wils. (531)
S. fuscum (Schimp.) Klingrr. (732)
S. girgensohnii Russow. (533)
S. magellanicum Brid. (733)
S. papillosum Lindb. (734)
S. rubellum Wils. (586)
S. russowii Warnst. (536)
S. squarrosus Crome. (540)
S. teres (Schimp.) Angstr. (737)

Splachnaceae

Splachnum ampullaceum Hedw. (738)
Tetraplodon angustatus (Hedw.) Bruch. & Schimp. in B.S.G. (739)

Tetraphidaceae

Tetraphis pellucida Hedw. (544)

Theliaceae

Myurella sibirica (C. Müll.) Reim. (466)

Thuidiaceae

Rauiella scita (P. Beauv.) Reim. (552)
Thuidium delicatulum (Hedw.) (551)

^a Specimens of all the Bryophytes listed are deposited at the Bailey Herbarium at Cornell University. The numbers in parentheses are the respective collection numbers assigned to each species.

VASCULAR PLANTS

Pteridophytes

Division Lycopodiophyta

Lycopodiaceae (Clubmoss Family)

Diphasiastrum digitatum (Dill. ex A. Braun) Holub [= *Lycopodium complanatum* var. *flabelliforme* Fern.]. Southern Running Pine. Frequent in dry woods, August - September.

Huperzia lucidula (Trevisan). (= *Lycopodium lucidulum* Michx.). Shining Clubmoss.* Frequent in cool, damp woods, July - August.

Lycopodium annotinum (L.) Bristly Clubmoss.* Common in damp woods, July - August.

L. clavatum (L.) Staghorn Clubmoss.* Common invader of clearings, August.

L. obscurum (L.) Ground Pine.* Common in dry woods, August.

Selaginellaceae (Spikemoss Family)

Selaginella apoda (L.) Fern. Creeping Spikemoss.

S. rupestris (L.) Spring. Rock Spikemoss.

Division: Equisetophyta

Equisetaceae (Horsetail Family)

Equisetum arvense L. Field-Horsetail.* Common from wet woods to dry roadsides, June - July.

E. sylvaticum L. Wood-Horsetail.* Abundant in half-shaded, wet woods, June.

Division: Polypodiophyta

Dennstaedtiaceae (Bracken Family)

Dennstaedtia punctilobula (Michx.) Moore. Hay-Scented Fern.* Common in moist, open, shady areas, August - September.

Pteridium aquilinum (L.) Kuhn. Bracken.* Common invader of clearings, September.

Dryopteridaceae (Wood Fern Family)

Athyrium filix-femina var. *angustum* (Willd.) G. Lawson. Lady Fern.* Common in moist woods, July.

Deparia acrostichoides (Swartz) M. Kato (Michx.) [= *Athyrium thelypteroides* (Michx.) Desv.]. Silvery Spleenwort.* Rich woods and shaded slopes, July - September.

Dryopteris campyloptera Clarkson [= *D. spinulosa* var. *americana* (Fisch.) Fern.]. Toothed or Mountain Wood Fern.* Frequent in moist woods, July - August.

D. carthusiana (Vill.) H.P. Fuchs [= *D. spinulosa* O.F. Muell] Watt: *D. austriaca* var. *spinulosa* (O.F., Muell.) Fisch.]. Spinulose Wood Fern.

D. intermedia (Muhl. ex Willd.) Gray [= *D. spinulosa* var. *intermedia* (Mulh.) Underw]. Common or Glandular Wood Fern.* Common in woods, August - September.

Onoclea sensibilis L. Sensitive Fern.* Abundant in wet woods or open areas. September - October.

Polystichum acrostichoides (Michx.) Schott. Christmas Fern.* Common in dry woods, June - July.

Ophioglossaceae (Adder's-Tongue Family)

Botrychium multifidum (Gmel.) Rupr. Leathery Grape-Fern. Rare in moist hardwoods.

Osmundaceae (Royal Fern Family)

Osmunda cinnamomea L. Cinnamon Fern.* Common in wet woods, May - June.

O. claytoniana L. Interrupted Fern.* Frequent in moist woods, May - June.

O. regalis L. Royal Fern.* Common in shaded, wet areas, May - June.

Polypodiaceae (Polypody Family)

Polypodium virginianum L. Common Polypody.* Uncommon in woods on rocks, July.

Thelypteridaceae (Marsh Fern Family)

Phegopteris connectilis (Michx.) Watt [= *Dryopteris phegopteris* L.; also *Thelypteris phegopteris* (L.) Slosson]. Christens Long Beech Fern.* Uncommon in rich damp woods, July.

Thelypteris noveboracensis (L.) Nieuwl. [= *Dryopteris noveboracensis* (L.) Gray]. New York Fern.* Common in rich woods, August - September.

Gymnosperms

Division Coniferophyta

Pinaceae (Pine Family)

Abies balsamea (L.) Mill. Balsam Fir.* Common in damp woods, May - June.

Tsuga canadensis (L.) Carr. Hemlock.* Abundant in moist woods, June - July.

Picea rubens Sarg. Red Spruce.* Common in rocky woods, June.

Pinus strobus L. Eastern White Pine.* Common in eastern part of Hubbard Brook Valley.

Pinus resinosa Ait. Red or Norway Pine.* Infrequent in rocky soil, also planted, June.

Taxaceae (Yew Family)

Taxus canadensis Marsh. American Yew, "Ground Hemlock."

Angiosperms

Division Magnoliophyta

Class Magnoliopsida (Dicotyledons)

Aceraceae (Maple Family)

Acer pensylvanicum L. Striped Maple.* Common in damp, shaded woodlands, May - June.

A. rubrum L. Red Maple.* Common on damp hillsides, April - May.

A. saccharum Marsh. Sugar Maple.* Common in woods, May - June.

A. spicatum Lam. Mountain Maple.* Common in cool woods, June.

Apiaceae (Parsley Family)

Hydrocotyle americana L. Water-Pennywort.* Common in wet, mossy places, June - August.

Osmorhiza claytoni (Michx.) C.B. Clarke.* Sweet Jarvil. Woods and wooded slopes, June - August.

Apocynaceae (Dogbane Family)

Apocynum androsaemifolium L. Spreading Dogbane.* Common on overgrown, gravelly banks, July.

Aquifoliaceae (Holly Family)

Ilex verticillata (L.). Gray Winter-Berry.

Nemopanthus mucronata (L.) Trel. Mountain Holly.

Araliaceae (Ginseng Family)

Aralia hispida Vent. Bristly Sarsaparilla. Frequent in dry woods, July.

A. nudicaulis L. Wild Sarsaparilla. Frequent in dry woods, May - June.

A. racemosa spp. *racemosa* L. Spikenard. Common invader of recent clearings, August.

Aralia spinosa L. Hercules' Club.

Panax trifolius L. Dwarf Ginseng. Frequent in rich woods, May - June.

Asclepiadaceae (Milkweed Family)

Asclepias syriaca L. Common Milkweed. Common near FS headquarters and along roadsides.

Asteraceae (Composite Family)

Achillea millefolium L. Common Yarrow. Common along roadsides and in waste areas, June - September.

Anaphalis margaritacea (L.) Clarke. Pearly Everlasting. Common in dry fields, July - September.

Aster acuminatus Michx. Sharp-Leaved Aster. Common in wet woods, August - September.

A. divaricatus L. Wood Aster. Dry woods and clearings, July - October.

A. lateriflorus (L.) Britt. Calico or Starved Aster.

A. macrophyllus L. Large-Leaved Aster. Dry to moist woods, thickets, and clearings, August - September.

A. novi-belgi L. New York Aster. Damp thickets and meadows, July - October.

A. spectabilis Ait. Showy Aster.

A. umbellatus Mill. Flat-Topped Aster. Common in moist thickets, July - September.

A. undulatus L. Wavy-Leaved Aster. Dry, open woods and clearings, August - October.

Cirsium vulgare (Savi) Tenore. Common Thistle.

Erechtites hieracifolia (L.) Raf. Fireweed.

Erigeron canadensis L. Horseweed.

Euthamia graminifolia (L.) Nutt. Grass-Leaved Goldenrod. Common in moist fields and along roadsides, August - September (= *Solidago graminifolia* (L.) Salisb.).

Gnaphalium obtusifolium L. Sweet Everlasting. Common in waste areas, July - September.

Hieracium aurantiacum L. Orange Hawkweed. Common along roadsides and in fields, June - July.

H. caespitosum Dumort (= *H. pratense* Tausch). King Devil. Occasional in fields, June - July.

H. paniculatum L. Panicked Hawkweed. Open woods, July - September.

H. scabrum Michx. Scabrous Hawkweed.

Lactuca biennes (Moench) Fern. Tall Blue Lettuce. Rich or damp thickets or openings, July - September.

L. canadensis L. Wild Lettuce. Common in fields, July - September.

L. hirsuta var. *sanguinea* (Bigelow) Fern.

Prenanthes alba (L.) White Lettuce. Rich woods and thickets, July - August.

P. altissima L. Tall White Lettuce. Moist woods, July - October.

P. trifoliolata (Cass.) Fern. Tall Rattlesnake Root. Common in moist woods, August - September.

Rudbeckia serotina Nutt. Black-Eyed Susan. Common in fields and roadsides, July - August.

Senecio aureus L. Groundsel.

Solidago caesia L. Blue-Stemmed Goldenrod. Common along woods roads, August - September.

S. flexicaulis L. Zigzag Goldenrod. Common in moist, open woods, July - September.

S. juncea Ait. Early Goldenrod.

S. macrophylla Pursh. Large-Leaved Goldenrod. Cool, damp woods and thickets, July - September.

S. rugosa Ait. Rough-Stemmed Goldenrod. Damp, open soil and borders of woods and streams, August - October.

S. canadensis L. Canada Goldenrod. Common in fields and along roadsides, August - September.

S. uliginosa Nutt. Bay Goldenrod. Occasional in wet woodlands, especially watersheds 4 and 101.

Taraxacum officinale G.H. Weber ex Wiggers. Common Dandelion.

Balsaminaceae (Touch-Me-Not Family)

Impatiens capensis Meerb. Spotted Touch-Me-Not.* Common in wet, open woods and rich soil, June - September.

Betulaceae (Birch Family)

Alnus glutinosa (L.) Gaertn. Black Alder. Locally naturalized, March - May.

A. incana ssp. *rugosa* (Du Roi) Clausen. Speckled Alder. Along Hubbard Brook and in moist areas.

Betula alleghaniensis Britt (= *B. lutea* Michx. f.) Yellow Birch.

B. cordifolia Regel [= *B. papyrifera* var. *cordifolia* (Regel) Fern.]. Heart-Leaved Birch. More common at higher elevations (750+ m).

B. papyrifera Marsh. Paper Birch. Common at lower and midelevations, May.
B. populifolia Marsh. Gray Birch. Common invader of cutover areas, May.
Corylus cornuta Marsh. Beaked Hazelnut. Occasional, open hillsides, April.
Ostrya virginiana (Mill.) K. Koch. Hophornbeam. Rocky ridge north of Mirror Lake in Mirror Lake watershed.

Campanulaceae (Bluebell Family)

Lobelia siphilitica L. Great Lobelia.* Poorly drained soils, seeps, especially watershed 101.
L. inflata L. Indian Tobacco.* Fields, roadsides, waste areas, and open woods, June - October.

Caprifoliaceae (Honeysuckle Family)

Diervilla lonicera Mill. Bush Honeysuckle.* Common in dry woods and rocky areas, June - August.
Linnaea borealis L. Twinflower.*
Lonicera canadensis Bartr. Fly Honeysuckle.* Common in woods, July - August.
Sambucus canadensis L. Common Elder.* Common in damp fields, June - July.
S. racemosa pubens (Michx.) House. Red-Berried Elder.* Common on gravelly roadsides, May.
Viburnum alnifolium Marsh. Witch Hobble, Hobblebush.* Common in cold moist woods, May.
V. cassinoides L. Wild Raisin.*

Caryophyllaceae (Pink Family)

Dianthus armeria L. Deptford Pink. Infrequent in open, grassy areas, June - August.

Clusiaceae (St. John's-Wort Family)

Hypericum ellipticum Hook. Pale St. John's-Wort.* Damp and sandy areas, June - August.
H. perforatum L. Common St. John's-Wort.* Common in fields, June - September.

Convolvulaceae (Morning Glory Family)

Convolvulus sepium L. Bindweed.* Common along roadsides, July - August.

Cornaceae (Dogwood Family)

Cornus alternifolia L.f. Alternate-Leaved Dogwood.* Occasional in wet woods, June - July.
C. canadensis L. Bunchberry.* Common in rich, cool woods, June -August.

Droseraceae (Sundew Family)

Drosera rotundifolia L. Round-Leaved Sundew.* Abundant in boggy areas, July - August.

Ericaceae (Heath Family)

Chamaedaphne calyculata (L.) Moench. Leatherleaf.
Epigaea repens L. Trailing Arbutus.
Gaultheria hispidula (L.) Bigel. Creeping Snowberry.
G. procumbens L. Wintergreen. Common in dry woods, July.
Kalmia angustifolia L. Sheep Laurel.
Rhododendron roseum (Loisel.) Rehd. Early Azalea. [may be *R. prinophyllum* (Small) Millias], though record is questionable].
Vaccinium angustifolium Ait. Low Sweet Blueberry. Common in cool, moist woods, June - July.
V. corymbosum L. Highbush Blueberry.
V. myrtilloides Michx. Velvetleaf Blueberry.

Fabaceae (Pea or Bean Family)

Lotus corniculatus L. Birdsfoot-Trefoil.* Fields, roadsides, and waste areas, June - September. Planted near weir 5 and FS headquarters (escaped).
Trifolium repens L. White Clover.* Common in open woods and clearings, June - October.

T. aureum Pollisk. Yellow or Hop Clover.* Common along dry roadsides, June - August.
Vicia americana Muhl. Purple Vetch.* Planted near weir 5 and FS headquarters (escaped).
V. cracca L. Cow Vetch.* Common weed of sandy soil, July - August.
Planted near weir 5 and FS headquarters (escaped).

Fagaceae (Beech Family)

Fagus grandifolia Ehrh. American Beech.* Common in rich, gravelly soil, May - June.
Quercus rubra L. Red Oak.* Eastern end of Hubbard Brook Valley at lower elevations.

Fumariaceae (Fumatory Family)

Dicentra canadensis (Goldie) Walp. Squirrel-Corn. Rare but recorded on watershed 3.
D. cucullaria (L.) Bernh. Dutchman's Breeches. Moist sites.

Grossulariaceae (Gooseberry Family)

Ribes cynobasti L. "Dogberry." On south-facing hillslopes.
R. glandulosum Grauer. Skunk Current. Common.

Hamamelidaceae (Witch-Hazel Family)

Hamamelis virginiana L. Witch-Hazel.* Common in dry, open woods,
October - November.

Juglandaceae (Walnut Family)

Juglans cinerea L. Butternut. Common near FS headquarters.

Lamiaceae (Mint Family)

Galeopsis tetrahit L. Hemp-Nettle. Common in waste areas, June - September.
Hedeoma pulegioides (L.) Pers. Pennyroyal. Occasional in dry, upland forest.
Lycopus uniflorus Michx. Northern Bugleweed. Common in shady, wet areas, July - September.
Prunella vulgaris L. Self-Heal. Common along roadsides, July - October.

Malvaceae (Mallow Family)

Malva sylvestris L. High Mallow.* Roadsides and waste areas, May - July.

Monotropaceae (Indian Pipe Family)

Monotropa uniflora L. Indian Pipe.* Frequent in rich woods. June-October.

Oleaceae (Olive Family)

Fraxinus americana L. White Ash.* Common in rich, deciduous woods, May - June.
F. nigra Marsh. Black Ash.* Occasional on poorly drained soils, especially along Hubbard Brook.

Onagraceae (Evening Primrose Family)

Circaea alpina L. Dwarf Enchanter's Nightshade. Common in wet, shaded areas,
June - July.
Epilobium angustifolium L. Fireweed. Frequent in low clearings, July - August.
E. coloratum Biehler. Purple-Leaved Willow Herb.
E. glandulosum Lehm. Northern Willow Herb. Infrequent in wet open woods,
July - September.
Ludwigia palustris (L.) Ell. var. *americana* (DC.) Fern. Water Purslane. Frequent in wet areas, rooted in mud, June - August.

Orobanchaceae (Broom Rape Family)

Epifagus virginiana (L.) Bart. Beech-Drops.* Common in gravelly soil of beech woods,
September - October.

Oxalidaceae (Wood Sorrel Family)

Oxalis montana Raf. Pink Wood Sorrel.
O. stricta L. Yellow Wood Sorrel. Dry, open soil, May - October.

Polygonaceae (Buckwheat Family)

- Rumex acetosella* L. Sheep Sorrel.
R. obtusifolius L. Bitter Dock. Common along roadsides, July - August.
Polygonum cilinode Michx. Fringed Blindweed. Dry thickets and rocky slopes, June - August.
P. persicaria L. Lady's Thumb.
P. scandens L. Climbing False Buckwheat. Clearings, clearcuts, watershed 2.

Portulacaceae (Purslane Family)

- Claytonia caroliniana* Michx. var. *caroliniana*. Spring Beauty.

Primulaceae (Primrose Family)

- Lysimachia terrestris* (L.) BSP.* Swamp-Candles. Common in moist openings, July - August.
L. ciliata L. Fringed Loosestrife.* Common in partial shade, July - August.
Trientalis borealis Raf. Starflower.* Frequent in moist openings, May - June.

Pyrolaceae

- Chimaphila umbellata* (L.) Bart. var. *cisatlantica* Blake.* Pipsissewa. Common in dry woods, July - August.
Moneses uniflora (L.) Gray. One-flowered wintergreen.*
Pyrola elliptica Nutt. Shinleaf.* Uncommon in rocky woods, July - August.

Ranunculaceae (Buttercup Family)

- Actaea pachypoda* Ell. White Baneberry.* Occasional in moist woods, June.
Anemone quinquefolia L. Wood Anemone.* Infrequent in dry woods, April - May.
Coptis trifolia spp. *groenlandica* (Oeder) Hulten. Goldthread.* Common in damp evergreen woods. May - June.
Ranunculus acris L. Common Buttercup.* Common in fields and along roadsides, May - October.
Thalictrum pubescens Pursh [= *T. polygamum* Muhl.]. Tall Meadow-Rue.* Common in wet woods, May - June.

Rosaceae (Rose Family)

- Amelanchier bartramiana* (Tasch) M. Roemer. Service-Berry.
A. canadensis (L.) Medic. Service-Berry. Occasional on damp, wooded slopes, May.
A. laevis Weig. Service-Berry. Occasional on margins of swamps and seeps.
Fragaria virginiana Duchesne. Wild Strawberry.
F. vesca L. var. *americana* Porter. Sow-Teat Strawberry. Wooded slopes and rocky banks, May - August.
Potentilla norvegica L. Three-Leaved Cinquifol. Common in open fields, May - August.
P. recta L. Sulfur Cinquifol. Common in dry fields, July - August.
P. simplex Michx. Old-Field Cinquifol. Common in clearings, April - June.
Prunus pensylvanica L.f. Pin Cherry. Common invader of clearings, May - June.
P. serotina Ehrh. Black Cherry. Occasional throughout forest.
P. virginiana L. Choke Cherry.
Rubus elegantulus Blanch. (= *R. setosus*). Bristly Blackberry. Abundant in dry clearings and thickets, May - September.
R. canadensis L. Smooth Bramble.
R. hispidus L. Bristly Blackberry.
R. idaeus L. (Michx.) Maxim. Wild Red Raspberry. Common along roadsides and in clearings.
R. odoratus L. Purple Flowering Raspberry. Common on open, gravelly banks, June - July.
R. pubescens Raf. Hairy Raspberry. Common in wet, shaded, grassy areas, May - June.
Sorbus americana Marsh. American Mountain Ash. Wet woods, August - October.
S. decora (Sarg.) C.K. Schneider. Mountain Ash.
Spiraea alba var. *latifolia* (Ait.) Dippel [= *S. latifolia* (Ait.) Borkh.]. Meadow-Sweet. Common in old clearings, August.
S. tomentosa L. Hardhack or Steeple-Bush. Frequent in clearings and moist pastures, July - August.

Rubiaceae (Madder Family)

- Galium asprellum* Michx. Rough Bedstraw.* Common in wet areas, July - August.
G. triflorum Michx. Sweet-Scented Bedstraw.* Frequent in rich woodlands, July - August.
Houstonia caerulea L. (= *Hedyotis caerulea* (L.) Hook.) Bluets.* Common along woods roads and in fields, May - June.
Mitchella repens L. Partridge Berry* Common in dry woods, June - July.

Salicaceae (Willow Family)

- Populus grandidentata*, Michx. Bigtooth Aspen. Common along roadsides.
Populus tremuloides Michx. Quaking Aspen.* Common on cutover areas, April - May.
Salix bebbiana Sarg. Beaked Willow.* Common in damp thickets, April - June.
S. discolor Muhl. Large Pussy-Willow.* Common in wet areas, May.
S. humilis Marsh. Small Pussy-Willow.

Saxifragaceae (Saxifrage Family)

- Chrysosplenium americanum* Schwein. Golden Saxifrage.
Tiarella cordifolia L. Foamflower. Common in rich woods, May - June.

Scrophulariaceae (Figwort Family)

- Chelone glabra* L. Turtlehead.* Occasional in wet, rich soil, July - September.
Gratiola aurea Muhl. Golden Hedge Hyssop.* Sandy or gravelly openings, May - July.
Veronica officinalis L. Speedwell.* Common in dry soil, June - July.

Tiliaceae (Linden Family)

- Tilia americana* L. Basswood. Eastern area of HBEF at low elevations.

Violaceae (Violet Family)

- Viola cucullata* Ait. Marsh Blue Violet.* Common in moist low woods, April - June.
V. incognita Brainerd. Large-Leaved White Violet.* Wet to dryish woods and thickets, May - June. [may be *V. macloskey* ssp. *pallens* (banks ex DC.) M.S. Baker].
V. rotundifolia Michx. Round-Leaved Violet or Yellow Violet.* Common in beech woods, April - May.

Class Liliopsida (Monocotyledons)

Araceae (Arum Family)

- Arisaema triphyllum* (L.) Schott *triphyllum* [= *A. atrorubens* (Ait.) Blume]. Jack-in-the-Pulpit.* Occasional in rich woods, May - June.

Cyperaceae (Sedge Family)

- Carex annectens* Bickn.
C. arctata Boott. Drooping Wood Sedge.
C. blanda Dew. Woodland Sedge.
C. brunnescens (Pers.) Poir var. *sphaerostachya* (Tuckerm.) Kukenth. Brownish Sedge.
C. communis Bailey. Fibrous-Rooted Sedge.
C. debilis Michx. var. *Rudgie*, Bailey. White-Edged Sedge.
C. deflexa (Hornem.)
C. gynandra Schwein [= *C. crinita* Lam. var. *gynandra* (Schwein.) Schwein. & Torr.]. Fringed Sedge. Infrequent in wet areas, July - September.
C. interior Bailey.
C. intumescens Rudge. Bladder Sedge. Common in damp areas, June - September.
C. leptonervia Fern. Finely-Nerved Sedge. Low woods, clearings, and thickets, May - July.
C. lurida Wahlenb. Sallow Sedge. Occasional in damp, sandy soil, June - October.
C. scabrata Schwein.
C. scoparia Schkuhr. Pointed Broom Sedge.
C. tribuliodes Wahlenb. Low woods, June - September.
C. vulpinoidea Michx.
Scirpus atrocinctus Fern.
S. atrovirens Willd.
S. cyperinus (L.) Kunth. Wool Grass. Infrequent in wet meadows, August - October.

Juncaceae (Rush Family)

Juncus brevicaudatus (Engelm.) Fern.

J. effusus L. Soft Rush.* Common in wet, sandy, open areas, June - July.

J. pelocarpus E. Meyer.* Occasional in boggy areas, especially along shore of Mirror Lake. July - September.

J. tenuis Willd. Slender Rush.* Common in wet, sandy, shaded areas, June - September.

Liliaceae (Lily Family)

Clintonia borealis (Ait.) Raf. Bluebead Lily. Frequent in rich woods, June.

Erythronium americanum Ker-Gawl. Yellow Adder's-Tongue or Trout Lily. Frequent in rich, deciduous or mixed woods, April - June.

Maianthemum canadense Desf. Canada Mayflower. Abundant in dry woods, June.

Medeola virginiana L. Indian Cucumber Root. Frequent in rich woods, June.

Polygonatum. pubescens (Willd.) Pursh. Hairy Solomon's Seal. Common in rich woods, May - June.

Smilacina racemosa (L.) Desf. False Solomon's Seal.

Streptopus amplexifolius (L.) DC. Twisted Stalk. Frequent in moist woods, May - June.

S. roseus Michx. Rosy Bells. Occasional in rich woods, May - June.

Trillium erectum L. Red Trillium. Common in rich woods, June.

T. undulatum Willd. Painted Trillium. Common in rich woods, May - June.

Uvularia sessilifolia L. Wild Oats. Abundant in dry or moist woods, May.

Veratrum viride Ait. Indian Poke or False Hellebore. Common in wet woods, June - July.

Orchidaceae (Orchis Family)

Corallorrhiza maculata Raf. Coral Root. Infrequent in woods, July - August.

Cypripedium acaule Ait. Pink Lady's Slipper. Frequent in dry woods on acid soil, June.

Goodyera tessellata Lodd. Rattlesnake-Plantain. Dry to moist woods, July - August.

Habernaria clavellata (Michx.) Spreng. var. *ophioglossoides* Fern. Green Wood Orchis.

Rare in boggy areas, July - August.

H. dilatata (Pursh) Hook. Bog Candle. Occasional in seeps.

H. macrophylla Goldie. Large Round-Leaved Orchis. Dry to moist woods, June - August.

H. virides (L.) R. Br. Long-Bracted Orchis.

Poaceae (Grass Family)

Agrostis capillaris L. [= *A. tenuis* Sibth.] Slender Satin-Grass

A. gigantea Roth. [= *A. alba* L. var. *palustris* (Huds) pers.]. Creeping Bent.

A. scabra [= *A. hymenalis* var. *scabra* (Willd.) Blomq.]. Hair Grass.

Brachyelytrum septentrionale (Babel) G. Tucker [= *B. erectum* var. *septentrionale* Babel].

Calamagrostis canadensis (Michx.) Beauv. var. *canadensis*.

Cinna arundinacea L. Wood Reed-Grass.* Frequent in moist and shady areas, July - August.

Danthonia compressa Austin ex Peck. Wild Oats.

D. spicata (L.) Beauv. ex Roemer & Roemer & J.A. Schultes. Wild Oats.

Deschampsia flexuosa (L.) Trin. Common Hairgrass.

Festuca ovina L. Sheep's Fescue.

Glyceria striata (Lam.) A. Hitchc.

Panicum lanuginosum Ell. var. *fasciculatum* (Torr.) Fern. Woody Panic-Grass.*

Common on open ground, July - August.

Note: Taxonomy based on the Cronquist system as given in "Flora of North America", Oxford University Press, New York, 1993. Asterisk following species name indicates specimen deposited in the herbarium at Hubbard Brook Experimental Forest.

INSECTS

Coleoptera

Carabidae

Curculionidae

Dytiscidae

Agabus sp.
Celina sp.
Coptotomas sp.
Dytiscus sp.
Hydroporus sp.

Elmidae

Optoservus sp. or *Stenelmis* sp.

Gyrinidae

Gyrinus sp.

Hydrophilidae

Helophorus sp.

Staphylinidae

Collembola

Diptera

Ceratopogonidae

Bezzia sp.
Dasyhelea sp.
Culicoides sp.
Forcipomyiinae

Chironomidae

Brillia parva
Conchapelopia prob. *goniodes*
Constempellina sp.
Corynoneura prob. *taris*
Cricotopus prob. *vierriensis*
Heterotrissocladius hirtapex
Micropsectra prob. *polita*
Nanocladius sp.
Parasphaenocladus sp.
Pentaneura sp.
Polypedilum sp.
Psectrocladius psilopterus group
Tanytarsus guerlus group
Thienemanniella prob. *xena*

Chironomidae

Aretopelopia flavifrons
Boreochlus persimilis
Eukiefferiella
Pseudokiefferiella sp.
Zavrelia sp.

Dixidae

Dixa sp. Meigen

Empididae

Oreogeton sp. Schiner

Muscidae

Simuliidae

Prosimulium sp. Roubaud
Simulium sp. Latreille
Stegopterna sp. Enderlein
Megaloptera sialidae

Thaumaleidae

Thaumalea sp.

Tipulidae

Antocha sp.
Cryptolabis sp.
Dicranota sp.
Hexatoma sp.
Limonia sp.
Molophilus sp.
Pedicia sp.
Tipula sp.

Ephemeroptera

Ameletus tertius?

Baetis spp.

Caenis sp.

Choroterpes basilis

Epeorus fragilis

Epeorus pleuralis

Epeorus vitrea

Ephemera sp.

Ephemerella aurivilli

Ephemerella cornuta

Ephemerella bicolor

Ephemerella dorothea

Ephemerella funeralis

Ephemerella nr. *subvaria*

Ephemerella simplex

Ephemerella temporalis

Habrophlebia vibrans

Habrophlebiodes americanum

Heptagenia pulla

Heptagenia thetis?

Hexagenia limbata

Leptophlebia cupida

Paraleptophlebia debilis

Paraleptophlebia mollis

Psuedocloeon sp.

Siphonurus quebecensis

Stenacron interpunctatum

Stenonema pudicum?

Stenonema vicarium

Lepidoptera

Arctiidae

Halisidota tessellaris (Smith & Abbot)
Hyphoraia parahenos
Isia isabella
Phragmatobia rubricusa (Harr.)

Citheroniidae

Anisota rubicunda (Fabricius)

Drepanidae

Drepana arcuata (Walker)
Falcaria bilineata (Packard)

Geometridae

Abbotana clemataria (Smith & Abbot)
Anacamptodes larvaria (Guenée)
Anagoga occiduaria (Walker)
Besma endropiaria (Grote)
Biston betularia cognataria (Guenée)
Campaea perlata (Guenée)
Caripeta divisata (Walker)
Ectropis crepuscularia (Hübner)
Ennomos magnarius (Guenée)
Ennomos subsignarius (Hübner)
Erranis tiliaria (Harris)
Hypagyrtis pustularia nubecularia (Guenée)
Itame pustularia (Guenée)
Lambdina fiscellaria (Guenée)
Melanolophia canadaria (Guenée)
Nematocampa filamentaria (Guenée)
Nemoria mimosaria (Guenée)
Nyctobia limitaria (Walker)
Pero morrisonaria (Edwards)
Phigalia titea (Cramer)
Plagodis alcoölaria (Guenée)
Plagodis kuntzingaria (Packard)
Protoarmia porcelaria indicitariza (Walker)
Semiothisa signaria dispuncta (Guenée)
Tetracis cachexiata (Guenée)

Hesperidae

Pamphila mystic

Lasciocampidae

Malacasoma americana (Fabricius)
Malacasoma disstria (Hübner)
Philodesma americana

Lymantridae

Dasychira sp.
Lymantria dispar
Notolophus antiqua
Notolophus ivecostigma

Noctuidae

Acronicta americana (Harris)
Acronicta fragilis (Guenée)
Acronicta innotata (Guenée)
Charadra deridens (Guenée)

Colocasia propinquilinea (Grote)
Crocigrapha normani (Grote)
Elaphria versicolor (Grote)
Eupsilia tristigmata (Grote)
Feralia jocosa (Guenée)
Idia aemula (Hübner)
Lithophane innominata (Smith)
Lithophane laticinerea (Grote)
Orthosia hibisci (Guenée)
Palthis angularis (Hübner)
Panthea acronictoides (Walker)
Parallelia bistrisaris (Hübner)
Polia latex (Guenée)
Syngrapha rectangula (Kirby)
Zale duplicata (Bethune)
Zale minerea (Guenée)

Notodontidae

Datana ministra (Drury)
Heterocampa biundata (Walker)
Heterocampa guttivitta (Walker)
Nadata gibbosa (Abbot & Smith)
Schizura impomoeae (Doubleday)
Schizura unicornis (Smith & Abbot)
Symmerista leucitys (Franclemont)

Nymphalidae

Boloria sp.
Limenitis archippus
Limenitis arthemis arthemis
Nymphalis antiopa - Mourning Cloak
Speyeria atlantis

Papilionidae

Papilio glaucus

Saturniidae

Actias luna (Linnaeus)
Telea polyphemus (Cramer)

Sphingidae

Ceratonia undulosa
Cerura boreales
Cressonia juglandis
Durapsa choerilis
Pachysphinx modesta
Paonias excaecatus (Smith)
Smerianthus geminatus

Thyatiridae

Pseudothyatira cymatophoroides (Guenée)

Neuroptera

Sialidae

Sialis sp.

Odonata

Aeshnidae

Cordulegastridae
Cordulegaster sp.

Gomphidae

Plecoptera

Acroneuria carolinensis?
Allocapnia maria
Allocapnia nivicola
Alloperla caudata
Alloperla chloris
Alloperla concolor
Amphinemura nigritta
Amphinemura wui
Cultus decusus
Hastaperla brevis
Isoperla bilineata
Isoperla francesco-orata
Isoperla holochlora
Isoperla similis
Leuctra ferruginea
Leuctra eucratenella
Leuctra duplicata
Leuctra grandis
Leuctra sibleyi
Leuctra tenuis
Leuctra truncata
Malirekus hastatus
Oemopteryx contorta
Ostrocerca albidipennis
Ostrocerca complexa
Ostracevca prolongata
Ostrocerca truncata
Paracapnia angulata-opis
Paraleuctra sara
Paranemoura perfecta
Peltoperla maria
Perlinella drymo
Phasganophora capitata
Pteronarcys biloba
Rasvena terna
Soyedina washngtoni
Sweltsa lateralis
Sweltsa onkos
Taenionema atlanticum
Taeniopteryx maura
Taeniopteryx parvula
Utaperla gaspesiensis

Trichoptera

Hydropsychidae
Diplectrona modesta Bks.
Dydropsyche slossonae Bks.
Hydropsyche sparna Ross
Parapsyche apicalis (Bks.)

Lepidostomatidae
Lepidostoma frosti (Milne)
Lepidostoma griseum (Bks.)

Lepidostoma lydia Ross
Lepidostoma sackeni (Bks.)
Lepidostoma sommermanae Ross
Lepidostoma swannonoa Ross
Theliopsyche grisea (Hag).

Limnephilidae

Ironoquia lyratus (Ross)
Lepidostoma consocius Walk.
Lepidostoma indivisus Walk.
Lepidostoma moestus Bks.
Lepidostoma ornatus Bks.
Lepidostoma submonilifer Walk.
Neophylax aniqua Ross
Neophylax consimilis Bett.
Neophylax ornatus Bks.
Onocosmoecus quadrinotatus Bks.
Platycentropus indistinctus Walk.
Platycentropus radiatus Walk.
Pseudostenophylax sparsus (Bks.)
Pseudostenophylax uniformis Bett.
Psychoglypha alaskensis (Bks.)
Psycnopsyche circularis (Prov.)
Psycnopsyche divergens (Walk.)
Psycnopsyche gentilis (McL.)
Psycnopsyche guttifer (Walk.)
Psycnopsyche luculenta (Bett.)
Psycnopsyche scabripennis (Ramb.)

Molannidae

Molanna blenda Sibl.

Odontoceridae

Psilotreta frontalis Bks.

Philopotamidae

Dolophiloides distinctus (Walk.)
Wormaldia moesta (Bks.)

Phyrganidae

Banksiola crotchi Bks.
Oligostomis sp. A.
Oligostomis sp. B
Ptilostomis ocellifera (Walk.)

Psychomytidae

Lype diversa (Bks.)
Nyctiophylax vestitus (Hag.)
Polycentropus cinereus Hag.
Polycentropus elarus Ross
Polycentropus maculatus Bks.

Hydroptilidae

Palaeaga petus celsus

Rhyacophylidae

Rhyacophila carolina Bks.
Rhyacophila fuscula (Walk.)
Rhyacophila glaberrima Ulm.
Rhyacophila invaria (Walk.)
Rhyacophila sp.

MOLLUSCS

(Listed in decreasing order of abundance)

Discus conkhitei
Zonitoides arboreus
Arion subfuscus
Pallifera dorsalis
Striatura exigua
Succinea sp.
Deroceras laeve
Retinella rhoadsi
Helicodiscus parallela
Euconulus sp.
Arion fasciatus complex
Zoogenetes harpa
Philomycus carolinianus
Striatura ferrea/milium
Triodopsis albolabris
Vertigo sp.
Triodopsis tridentata
Mesodon sayanus
Strobilops labyrinthica
Oxychilus cellarius
Stenotrema fraternum
Cionella lubrica
Deroceras reticulatum
Anguispira alternata

OTHER INVERTEBRATES

Oligochaeta

Platyhelminthes

Nematoda

Arthropoda

Copepoda
Harpacticoids
Cyclopoids

Cladocera
Chydorinae

Hydracarina

FISH

Catostomidae (Sucker family)

Catostomus commersoni - Common White Sucker (also in Mirror Lake).

Cottidae (Sculpin family)

Cottus sp. - Muddlers/Sculpins

Cyprinidae (Minnow family)

Rhinichthys atratulus - Black-Nosed Dace.

Salmonidae (Trout family)

Salmo salar - Atlantic Salmon.

Salmo trutta - Brown Trout (also in Mirror Lake).

Salvelinus fontinalis - Brook Trout (also in Mirror Lake).

AMPHIBIANS

Anura

Bufo

Bufo americanus - American Toad.

Hyla

Pseudacris (formerly *Hyla*) *crucifer* - Spring Peeper.

Rana

Rana clamitans - Green Frog.

Rana palustris - Pickerel Frog (also in Mirror Lake)

Rana pipiens - Northern Leopard Frog.

Rana sylvatica - Wood Frog.

Urodela

Plethodontidae

Desmognathus fuscus fuscus - Northern Dusky Salamander.

Eurycea bislineata bislineata - Northern Two-Lined Salamander.

Gyrinophilus porphyriticus porphyriticus - Northern Spring Salamander.

Plethodon cinereus - Red-Backed Salamander.

Salamandridae

Notophthalmus viridescens viridescens - Red-Spotted Newt (also in Mirror Lake)

REPTILES

Squamata

Colubridae

Lampropeltis dolia *triangulum* - Eastern Milk Snake.

Opheodrys vernalis vernalis - Eastern Smooth Green Snake.

Storeria occipitomaculata occipitomaculata - Northern Red-bellied Snake.

Thamnophis sirtalis sirtalis - Eastern Garter Snake.

Chelonia

Kinosternidae

Clemmys guttata - Spotted Turtle.

BIRDS

Seasonal Occurrence

PR = permanent (year-round) resident
 SR = summer resident
 WR = winter resident
 MI = migrant

Relative Abundance

C = common/abundant (found each year)
 U = uncommon (regularly occurring but in low numbers; often patchy distribution)
 O = occasional (present in some years; low abundance)
 V = vagrant (includes accidentals)

Habitat/Elevation

R = ridge lines, high elevation, mostly coniferous forests
 H = hardwoods and mixed hardwood-coniferous, mostly midelevations
 E = edges, and early successional vegetation in clearcuts
 D = disturbed areas, rural residential, mostly areas near FS headquarters and Mirror Lake
 W = near water (Mirror Lake, along streams, in wetlands and marshes)

	<u>Seasonal occurrence</u>	<u>Relative abundance</u>	<u>Habitat elevation</u>
<i>Gavia immer</i> - Common Loon	MI	U	W
<i>Ardea herodias</i> - Great Blue Heron	SR	U	W
<i>Branta canadensis</i> - Canada Goose	MI	U	W
<i>Anas platyrhynchos</i> - Mallard	SR	U	W
<i>Aythya collaris</i> - Ring-Necked Duck	MI	U	W
<i>Mergus merganser</i> - Common Merganser	SR, MI	O	W
<i>Cathartes aura</i> - Turkey Vulture	SR	U	D
<i>Pandion haliaetus</i> - Osprey	MI	O	W
<i>Buteo jamaicensis</i> - Red-Tailed Hawk	SR	U	H,E,D
<i>Buteo platypterus</i> - Broad-Winged Hawk	SR	C	H
<i>Accipiter striatus</i> - Sharp-Shinned Hawk	SR	U	H,R
<i>Accipiter cooperii</i> - Cooper's Hawk	SR?	O	H,E
<i>Accipiter gentilis</i> - Northern Goshawk	SR,M	O	R,H
<i>Falco sparverius</i> - American Kestrel	SR	U	D
<i>Bonasa umbellus</i> - Ruffed Grouse	PR	C	H,D
<i>Melagris gallopavo</i> - Wild Turkey	PR	O	H,E
<i>Philohela minor</i> - American Woodcock	SR	U	E,W
<i>Zenaidura macroura</i> - Mourning Dove	SR	C	D
<i>Columba livia</i> - Rock Dove	PR	O	D
<i>Coccyzus erythrophthalmus</i> - Black-Billed Cuckoo	SR	O	H,D
<i>Coccyzus americanus</i> - Yellow-Billed Cuckoo	SR	O	E,D,W
<i>Strix varia</i> - Barred Owl	PR	C	H,D
<i>Aegolius acadicus</i> - Saw-Whet Owl	WR,SR	O	H,R,
<i>Chordeiles minor</i> - Common Nighthawk	SR	V	D
<i>Chaetura pelagica</i> - Chimney Swift	SR	U	H,D,E
<i>Archilochus colubris</i> - Ruby-Throated Hummingbird	SR	U	H,D
<i>Megaceryle alcyon</i> - Belted Kingfisher	SR	U	W
<i>Sphyrapicus varius</i> - Yellow-Bellied Sapsucker	SR	C	H,D
<i>Picoides pubescens</i> - Downy Woodpecker	PR	C	H,D
<i>Picoides villosus</i> - Hairy Woodpecker	PR	C	H,D,R
<i>Colaptes auratus</i> - Northern Flicker	SR	C	D
<i>Dryocopus pileatus</i> - Pileated Woodpecker	PR	C	H,D
<i>Contopus borealis</i> - Olive-Sided Flycatcher	SR	O	R,E
<i>Contopus virens</i> - Eastern Wood Pewee	SR	U	H
<i>Empidonax flaviventris</i> - Yellow-Bellied Flycatcher	SR	U	R
<i>Empidonax vireescens</i> - Acadian Flycatcher	SR	V	H
<i>Empidonax alnorum</i> - Alder Flycatcher	SR	U	E,D

<i>Empidonax minimus</i> - Least Flycatcher	SR	U	H,D
<i>Sayornis phoebe</i> - Eastern Phoebe	SR	C	D,H
<i>Myiarchus crinitus</i> - Great Crested Flycatcher	SR	U	H
<i>Tyrannus tyrannus</i> - Eastern Kingbird	SR	U	D
<i>Progne subis</i> - Purple Martin	SR	V	D,W
<i>Tachycineta bicolor</i> - Tree Swallow	SR	C	D,W
<i>Riparia riparia</i> - Bank Swallow	SR	U	D,W
<i>Hirundo rustica</i> - Barn Swallow	SR	C	D,W
<i>Cyanocitta cristata</i> - Blue Jay	PR	C	H,D,E
<i>Corvus brachyrhynchos</i> - American Crow	PR	C	D,E
<i>Corvus corax</i> - Common Raven	PR	U	D,H
<i>Parus atricapillus</i> - Black-Capped Chickadee	PR	C	H,D,R
<i>Parus hudsonicus</i> - Boreal Chickadee	PR	O	R
<i>Sitta carolinensis</i> - White-Breasted Nuthatch	PR	C	H,D
<i>Sitta canadensis</i> - Red-Breasted Nuthatch	PR	U	H,R
<i>Certhia familiaris</i> - Brown Creeper	PR	U	H,R
<i>Troglodytes aedon</i> - House Wren	SR	U	D
<i>Troglodytes troglodytes</i> - Winter Wren	SR	C	H,D
<i>Regulus satrapa</i> - Golden-Crowned Kinglet	PR	U	R
<i>Regulus calendula</i> - Ruby-Crowned Kinglet	MI	U	H,D
<i>Sialia sialis</i> - Eastern Bluebird	SR	U	D
<i>Catharus fuscescens</i> - Veery	SR	C	H,D
<i>Catharus minimus</i> - Gray-Cheeked Thrush	MI	O	H,R
<i>Catharus ustulatus</i> - Swainson's Thrush	SR	U	H,R
<i>Catharus guttatus</i> - Hermit Thrush	SR	C	H,D
<i>Hylocichla mustelina</i> - Wood Thrush	SR	U	H,D
<i>Turdus migratorius</i> - American Robin	SR	C	D,H
<i>Dumetella carolinensis</i> - Gray Catbird	SR	U	D,E
<i>Bombycilla cedrorum</i> - Cedar Waxwing	SR	C	D
<i>Bombycilla garrulus</i> - Bohemian Waxwing	WR	O	D,E
<i>Sturnus vulgaris</i> - European Starling	PR	C	D
<i>Vireo solitarius</i> - Blue-Headed Vireo	SR	U	H,R
<i>Vireo flavifrons</i> - Yellow-Throated Vireo	SR	O	D
<i>Vireo gilvus</i> - Warbling Vireo	SR	O	D
<i>Vireo philadelphicus</i> - Philadelphia Vireo	SR	O	H
<i>Vireo olivaceus</i> - Red-Eyed Vireo	SR	C	H,D
<i>Vermivora peregrina</i> - Tennessee Warbler	MI	C	H,D
<i>Vermivora ruficapilla</i> - Nashville Warbler	SR	U	E,D
<i>Parula americana</i> - Northern Parula	SR	U	D
<i>Dendroica pensylvanica</i> - Chestnut-Sided Warbler	SR	C	E,D
<i>Dendroica magnolia</i> - Magnolia Warbler	SR	U	R,H,D
<i>Dendroica tigrina</i> - Cape May Warbler	MI	U	H,R
<i>Dendroica caerulescens</i> - Black-Throated Blue Warbler	SR	C	H
<i>Dendroica coronata</i> - Yellow-Rumped Warbler	SR	U	H,R
<i>Dendroica virens</i> - Black-Throated Green Warbler	SR	C	R,H
<i>Dendroica fusca</i> - Blackburnian Warbler	SR	U	R,H
<i>Dendroica castanea</i> - Bay-Breasted Warbler	MI	U	R,H
<i>Dendroica striata</i> - Blackpoll Warbler	MI	U	R,H
<i>Mniotilta varia</i> - Black-and-White Warbler	SR	U	H,E
<i>Setophaga ruticilla</i> - American Redstart	SR	C	E,H,D
<i>Seiurus aurocapillus</i> - Ovenbird	SR	C	H
<i>Seiurus noveboracensis</i> - Northern Waterthrush	SR	U	W
<i>Seiurus motacilla</i> - Louisiana Waterthrush	SR	O	W
<i>Oporornis philadelphia</i> - Mourning Warbler	SR	U	E
<i>Geothlypis trichas</i> - Common Yellowthroat	SR	C	E,D
<i>Wilsonia pusilla</i> - Wilson's Warbler	MI	O	D,E
<i>Wilsonia canadensis</i> - Canada Warbler	SR	U	H,E
<i>Piranga olivacea</i> - Scarlet Tanager	SR	C	H
<i>Pheucticus ludovicianus</i> - Rose-Breasted Grosbeak	SR	C	H
<i>Passerina cyanea</i> - Indigo Bunting	SR	C	E,D
<i>Pipilo erythrophthalmus</i> - Rufous-Sided Towhee	SR	U	E,D

<i>Spizella arborea</i> - American Tree Sparrow	WR	O	D,H
<i>Spizella passerina</i> - Chipping Sparrow	SR	C	D
<i>Spizella pusilla</i> - Field Sparrow	SR	U	D
<i>Melospiza melodia</i> - Song Sparrow	SR	C	D
<i>Melospiza lincolni</i> - Lincoln's Sparrow	MI	O	D
<i>Melospiza georgiana</i> - Swamp Sparrow	SR	U	D,W
<i>Zonotrichia albicollis</i> - White-Throated Sparrow	SR	C	D,E
<i>Zonotrichia leucophrys</i> - White-Crowned Sparrow	MI	U	D,H
<i>Junco hyemalis</i> - Dark-Eyed Junco	SR	U	H,R,D
<i>Plectrophenax nivalis</i> - Snow Bunting	MI/WR	O	D,E
<i>Agelaius phoeniceus</i> - Red-Winged Blackbird	SR	U	W,D
<i>Quiscalus quiscula</i> - Common Grackle	SR	C	D
<i>Molothrus ater</i> - Brown-Headed Cowbird	SR	U	D
<i>Icterus galbula</i> - Baltimore Oriole	SR	U	D
<i>Pinicola enucleator</i> - Pine Grosbeak	WR	O	H,R,D
<i>Carpodacus purpureus</i> - Purple Finch	PR	C	H,R,D
<i>Carpodacus mexicanus</i> - House Finch	PR	U	D
<i>Loxia curvirostra</i> - Red Crossbill	WR	O	R,H,D
<i>Loxia leucoptera</i> - White-Winged Crossbill	WR	O	R,H,D
<i>Carduelis flammea</i> - Common Redpoll	WR	O	H,D
<i>Carduelis pinus</i> - Pine Siskin	WR	O	H,D
<i>Carduelis tristis</i> - American Goldfinch	SR,WR	C/U	D,H
<i>Coccothraustes vespertinus</i> - Evening Grosbeak	PR	C/U	H,D
<i>Passer domesticus</i> - House Sparrow	PR	U	D

MAMMALS

Insectivora

Soricidae

Blarina brevicauda - Shorttail Shrew. Common in forest litter/watersheds.

Microsorex hoyi - Pygmy Shrew. Recorded but status unknown.

Sorex cinereus - Masked Shrew. Common in forest litter/watersheds.

Talpidae

Parascalops breweri - Hairytail Mole. Infrequent, status unknown.

Chiroptera

Vespertilionidae

Myotis lucifugus - Little Brown Myotis. Recorded at Pleasant View Farm near Mirror Lake.

Carnivora

Canidae

Canis latrans - Coyote. Occasional; sightings increased in 1990's.

Vulpes fulva - Red Fox. Present in watersheds but more common near Mirror Lake.

Felidae

Lynx rufus - Bobcat. No recent records; probably more common earlier.

Mustelidae

Martes pennanti - Fisher. Relatively common in watersheds.

Mephitis mephitis - Striped Skunk. More common around Mirror Lake.

Mustela frenata - Longtail Weasel. Common in watersheds, especially in high rodent years.

Mustela spp. *M. erminea* probably, but no verified record.

Mustela vison - Mink. Present in small numbers, mostly along stream courses.

Procyonidae

Procyon lotor - Raccoon. Widespread, especially at lower elevations; present in watersheds.

Ursidae

Ursus americanus - Black Bear. Present in watersheds and fairly common near Mirror Lake.

Rodentia

Castoridae

Castor canadensis - Beaver. Near Mirror Lake and in wetlands in upper Hubbard Brook Valley.

Cricetidae

Clethrionomys gapperi - Boreal Redback Vole. Common in forest litter.

Ondatra zibethica - Muskrat. Near Mirror Lake.

Peromyscus maniculatus - Deer Mouse. Abundant in watersheds.

Peromyscus leucopus - White-Footed Mouse. Occurrence verified but status unknown.

Erethizontidae

Erethizon dorsatum - Porcupine. Relatively common in watersheds especially at higher elevations.

Muridae

Mus musculus - House Mouse. Common near Mirror Lake.

Sciuridae

Glaucomys sabrinus - Northern Flying Squirrel. Status unclear.

Glaucomys volans - Southern Flying Squirrel. Status unclear, probably the more common species.

Marmota monax - Woodchuck. Common in disturbed areas, along roadsides.

Sciurus carolinensis - Eastern Gray Squirrel. Common near Mirror Lake, rare in watersheds.

Tamias striatus - Eastern Chipmunk. Common in watersheds and near Mirror Lake.

Tamiasciurus hudsonicus - Red Squirrel. Common/abundant in watersheds.

Zapodidae

Napaeozapus insignis - Woodland Jumping Mouse. Common in forest litter/watersheds.

Lagomorpha

Leporidae

Lepus americanus - Snowshoe Hare. Common in some years, especially at higher elevations.

Artiodactyla

Cervidae

Alces alces - Moose. More common in recent years (1990's); extensive winter browsing evident in many areas of watersheds.

Odocoileus virginianus - White-Tailed Deer. In watersheds at low densities.

ORGANISMS IN MIRROR LAKE

HYDROPHYTES

Submersed vascular plants of the mat community (*isoetid* growth form):

Rosette plants:

Eleocharis acicularis L. (R. & S.)

Eriocaulon septangulare With.

Isoetes muricata Dur. †Synonymous with *I. braunii* Dur. and *I. echinospora* Dur. var. *braunii* (Dur.) Engelm.

Isoetes tuckermani A. Br.

Juncus pelocarpus Mey.

Lobelia dortmanna L.

Sagittaria graminea Michx.

Plants with short, stiff stems:

Elatine minima (Nutt.) Fish & Mey.

Gratiola aurea (Muhl.)

Submersed plants with long, flexuous stems or leaves (*elodeid* growth-form):

Vascular plants:

Potamogeton berchtoldii Fieber [synonymous with *P. pusillus* L. var. *tenuissimus* Mert. & Koch.]

Potamogeton spirillus Tuckerm.

Utricularia purpurea Walt.

Bryophytes:

Chiloscyphus fragilis (Roth) Schiffn.

Drepanocladus fluitans (Hedw.) Warnst.

Fontinalis novae-angliae Sull.

Charophytes and Rhodophytes:

Batrachospermum sp.

Nitella flexilis (L.) Ag.

Nitella gracilis (Sm.) Ag.

Nitella tenuissima (Desv.) Kütz.

Floating-leaved vascular plants (*nymphaeid* growth-form):

Nuphar variegatum Engelm.

Nymphaea odorata Ait.

Potamogeton epihydrus Raf. var. *ramosus*

Sparganium angustifolium Michx.

EPIPELIC ALGAE

Chlorophyceae

Closterium (abundant)

Colacium (epizoic on cyclopooids)

Cosmarium

Desmidium (abundant)

Euastrum

Gonium

Micrasterias (abundant)

Pediastrum

Phacus

Pleurotaenium (abundant)

Spinocosmarium

Spirogyra

Staurastrum (abundant)

Staurdesmus

Chrysophyceae

Many species, including pennate, centric, and filamentous types (abundant)

Bacteriophyceae

Calothrix

Merismopedia

Nostoc (abundant)

Oscillatoria (abundant)

PHYTOPLANKTON

In this section, a given species may be listed under more than one species name. Each species is followed by a number identifying the contributing investigator: F. DeNoyelles (1); S.K. Holmgren (2); P. Godfrey (3); [see DeNoyelles and Likens 1985].

Cyanophyceae

Anabaena circinalis Rabenhorst (3)

Anabaena spiroides Klebahn (1)
Anabaena sp. (3)
Aphanizomenon flos-aquae (L.) Ralfs (3)
Aphanocapsa delicatissima West & West (2, 3)
Aphanotheca clathrata G. S. West (2)
Chroococcus dispersus (Keissl.) Lemmermann v. *minor* G. M. Smith (3)
Chroococcus limneticus Lemmermann (1, 2, 3)
Chroococcus turgidus (Kütz.) Nägeli (2)
Gloeocystis uesiculosa Nägeli (3)
Gomphosphaeria lacustris Chodat (2, 3)
Lyngbya nordgaardii Wille (3)
Merismopedia elegans A. Braun (2)
Merismopedia glauca (Ehr.) Nägeli (2, 3)
Merismopedia tenuissima Lemmermann (1, 2, 3)
Microcystis aeruginosa Kützing (2, 3)
Oscillatoria agardhii Gomont (3)
Oscillatoria agardhii v. *isothrix* Skuja (2)
Oscillatoria limnetica Lemmermann (3)
Oscillatoria limosa (Roth) C. A. Agardh (2)
Oscillatoria rubescens De Candolle (3)
Oscillatoria subbrevis Schmidle (3)
Oscillatoria tenuis C. A. Agardh (3)

Chlorophyceae

Ankistrodesmus braunii (Näg.) Brunnthaler (3)
Ankistrodesmus falcatus (Corda) Ralfs (1, 2, 3)
Ankistrodesmus falcatus v. *acicularis* (A. Braun) G. S. West (2)
Ankistrodesmus setigerus (Schrod.) G.S. West (2)
Ankistrodesmus spiralis (Turner) Lemmermann (2)
Arthrodesmus incus (Bréb.) Hassall (2, 3)
Arthrodesmus phimus Turner (3)
Botryococcus braunii Kützing (1, 2, 3)
Botryococcus protuberans West and West v. *minor* G.M. Smith (3)
Carteria sp. (2)
Chlamydomonas sp. (1)
Chlamydomonas spp. (2)
Chlamydomonas sp. (3)
Chlorella vulgaris Beyerinck (2, 3)
Closterium incurvum deBrébisson (3)
Coccomyxa minor Skuja (2)
Coccomyxa sp. (1)
Coelastrum microporum Nägeli (3)
Cosmarium depressum (Näg.) Lund (1, 3)
Cosmarium depressum v. *achondrum* (Boldt) West and West (2)
Cosmarium impressulum Elfving (3)
Cosmarium nitidulum DeNotaris (3)
Crucigenia tetrapedia (Kirch.) West & West (1, 2)
Dictyosphaerium pulchellum Wood (1, 2, 3)
Dispora crucigenioides Printz (3)
Elakatothrix gelatinosa Wille (1, 2)
Euastrum abruptum Nordstedt v. *Iagoense* (Norst.) Krieger (3)
Euastrum binale (Turp.) Ehrenberg (3)
Eudorina elegans Ehrenberg (2)
Gemmellicystis neglecta Teiling and Skuja (2)
Geminella minor (Näg.) Heering (2, 3)
Gloeococcus schroeteri (Chod.) Lemmermann (2)
Gloeocystis planktonica (West & West) Lemmermann (1, 2, 3)
Gonium pectorale Müller (1, 2)
Gymnozyga moniliformis (Ehr.) v. *maxima* Irene-Marie (2, 3)
Kirchneriella contorta (Schmidle) Bohlin (3)
Kirchneriella elongata G. M. Smith (3)

Nephrocytium agardhianum Nägeli (3)
Nephrocytium limneticum (G. M. Smith) Skuja (2, 3)
Oocystis borgei Snow (2, 3)
Oocystis crassa Wittrock (3)
Oocystis lacustris Chodat (2)
Oocystis parva West & West (3)
Oocystis pusilla Hansgirg (3)
Oocystis submarina Lagerheim v. *variabilis* Skuja (2)
Oocystis sp. (1)
Pandorina morum (Mull.) Bory (2, 3)
Paulschulzia pseudovolvox (Schulz & Teiling) Skuja (2)
Pediastrum boryanum (Turp.) Meneghini (2)
Pediastrum tetras (Ehr.) Ralfs (2)
Pyramimonas tetrahynchus Schmarida (2)
Quadrigula closterioides (Bohlin) Printz (2)
Quadrigula lacustris (Chod.) G. M. Smith (3)
Quadrigula pfitzeri (Schrod.) Printz (1, 2)
Scenedesmus abundans (Kirch.) Chodat (1)
Scenedesmus apiculatus (West & West) Chodat (2)
Scenedesmus bijuga (Turp.) Lagerheim (1, 3)
Scenedesmus opoliensis P. Richter (3)
Scenedesmus quadricauda (Turp.) deBrebisson (2, 3)
Selenastrum minutum (Nag.) Collins (3)
Sphaerosozma excavata Ralfs v. *subquadratum* West & West (3)
Spondylosium planum (Wolle) West & West (2, 3)
Staurastrum arachne Ralfs (2)
Staurastrum cuspidatum Breb. v. *diuergens* Nordstedt (3)
Staurastrum dejectum deBrebisson (2)
Staurastrum lacustre G. M. Smith (3)
Staurastrum limneticum Schmidle (2, 3)
Staurastrum lunatum Ralfs (3)
Staurastrum megecanthum Lundell (3)
Staurastrum muticum deBrebisson (3)
Staurastrum natator W. West (3)
Staurastrum paradoxum Meyen (3)
Staurastrum pentacerum (Wolle) G. M. Smith (3)
Staurastrum spiculiferum G. M. Smith (3)
Staurastrum sp. (1)
Staurodesmus sp. (1)
Stichococcus minor Nägeli (2)
Tetrademus smithii Prescott (3)
Tetraedron asymmetricum Prescott (3)
Tetraedron minimum (A. Braun) Hansgirg (1, 2, 3)
Tetraedron minimum v. *tetralobulatum* Reinsch (1)
Volvox aureus Ehrenberg (2)

Euglenophyceae

Euglena gracilis Klebs (3)
Euglena viridis Ehrenberg (2)
Euglena sp. (1)
Euglena sp. (3)
Lepocinclis sp. (2)
Menoidium costatum Korschik (2)
Phacus longicaudata (Ehr.) Dujardin (1, 2)
Rhabdomonas incurva Fresenius (1)
Trachelomonas spp. (1)
Trachelomonas sp. (2)

Chrysophyceae

Bitrichia chodatii (Reverdin) Chodat (1, 2, 3)
Chlorochromonas polymorpha Gavaudan (3)
Chromulina mikroplankton Pascher (3)

Chromulina minima Doflein (3)
Chromulina nebulosa Cienkowsky (3)
Chromulina oualis Klebs (3)
Chromulina woroniniana Fisch
Chromulina sp. (1)
Chromulina sp. (2)
Chromulina sp. (3)
Chrysidiastrum catenatum Lauterborn (1, 2)
Chrysidalis peritaphrena Schiller (3)
Chrysochromulina parva Lackey (1, 2)
Chrysococcus rufescens Klebs (2, 3)
Chrysococcus sp. (1)
Chrysococcus sp. (2)
Chrysoikos skujai (Nauwerck) Willen (2)
Chrysolykos planctonicus Mack (1)
Chrysophaerella longispina Lauterborn (1, 2)
Dinobryon acuminatum Ruttner (2, 3)
Dinobryon bavaricum Imhof (1, 2)
Dinobryon borgei Lemmermann (1)
Dinobryon crenulatum West & West (2)
Dinobryon cylindricum Imhof (1, 2)
Dinobryon divergens Imhof (1, 2, 3)
Dinobryon divergens v. *angulatum* (Sel.) Brunthaler (1)
Dinobryon diuergens v. *schauinslandii* (Lemm.) Brunnthaler (1)
Dinobryon sociale Ehrenberg (2, 3)
Dinobryon sertularia Ehrenberg (2, 3)
Dinobryon suecicum Lemmermann (1)
Dinobryon tabellariae (Lemm.) Pascher (1, 3)
Kephyrion boreale Skuja (2)
Kephyrion littorale Lund (2)
Kephyrion ovum Pascher (3)
Mallomonas acaroides Perty (2, 3)
Mallomonas akrokomos Ruttner (2)
Mallomonas akrokomas v. *parvula* Conrad (1, 2)
Mallomonas caudata Conrad (1, 2, 3)
Mallomonas elongata Reverdin (2)
Mallomonas globosa Schiller (1, 2)
Mallomonas pseudocoronata Prescott (3)
Mallomonas reginae Teiling (2)
Mallomonas tonsurata Teiling (1, 2, 3)
Monochrysis aphanaster Skuja (1, 2)
Monochrysis sp. (2)
Monosiga brevicollis Ruin. (3)
Ochromonas sp. (1)
Ochromonas sp. (2)
Ochromonas sp. (3)
Pseudokephyrion elegans (Conr.) Conrad (1)
Pseudokephyrion entzii Conrad (1, 2)
Pseudokephyrion spirale Schmid (2)
Pseudokephyrion sp. (1)
Synura adamsii G. M. Smith (1, 3)
Synura uvella Ehrenberg (1, 2, 3)
Uroglena volvox Ehrenberg (1)
Uroglenopsis americana (Calkins) Lemmermann (1, 2, 3)

Diatomeae

Asterionella formosa Hassall (1, 2, 3)
Coscinodiscus sp. (3)
Cyclotella bodanica Eulenst. (3)
Cyclotella comensis Grunow (1, 2)
Cyclotella comta (Ehr.) Katzing (1, 2, 3)
Cyclotella glomerata Bachmann (3)

Cymbella sp. (3)
Cymbella angustata (W. Sm.) Cleve (3)
Cymbella lanceolata (Ag.) Ag. (3)
Cymbella tumidula Grun. ex A.S. (3)
Diatoma vulgare Bory (3)
Fragilaria capucina Desm. (2)
Fragilaria construens (Ehr.) Grunow (3)
Fragilaria crotonensis Kitton (2, 3)
Uelosira ambigua (Grun.) Muller (1, 2, 3)
Uelosira distans (Ehr.) Kutzing v. *alpigena* Grunow (2)
Melosira granulata (Ehr.) Ralfs (3)
Melosira italica (Ehr.) Kutzing v. *subarctica* Muller (2)
Melosira varians C. A. Agardh (3)
Neidium iridis (Ehr.) Cl. v. *amphigomphus* (Ehr.) A. Mayer (3)
Nitzschia acicularis W. Smith (3)
Rhizosolenia eriensis H. L. Smith (1, 3)
Stephanodiscus dubius (Fricke) Hust. (3)
Synedra delicatissima W. Sm. v. *angustissima* Grunow (2)
Synedra nana Meister (3)
Synedra radians Kützing (1, 2, 3)
Synedra rumpens Kützing (3)
Synedra sp. (1)
Tabellaria fenestrata (Lyngb.) Katzing (1, 2, 3)
Tabellaria flocculosa (Roth) Kützing (2)

Cryptophyceae

Chroomonas coerulea (Geitler) Skuja (2)
Cryptomonas compressa Pascher (3)
Cryptomonas marssonii Skuja (1, 2)
Cryptomonas obovata Skuja (2)
Cryptomonas ovata Ehrenberg (2, 3)
Cryptomonas platyuris Skuja (1)
Cryptomonas rostratiformis Skuja (2, 3)
Cryptomonas rufescens Skuja (2)
Cryptomonas sp. (1)
Gonystomum semen (Ehr.) Diesing (1, 2)
Katablepharis ovalis Skuja (1, 2)
Rhodomonas lacustris Pascher and Ruttner (3)
Rhodomonas minuta Skuja (2, 3)
Sennia parvula Skuja (2)

Peridineae

Amphidinium sp. (2)
Ceratium hirundinella (Mull.) Schrank (1, 2, 3)
Cryptaulax vulgaris Skuja (2)
Glenodinium gymnodinium Penard (3)
Glenodinium palustre (Lemm.) Schiller (2, 3)
Glenodinium pulvisculus (Ehr.) Stein (3)
Gymnodinium fuscum (Ehr.) Stein (2)
Gymnodinium helveticum Penard (2)
Gymnodinium lacustre Schiller (2)
Gymnodinium mirabile Penard (1, 2)
Gymnodinium uberrimum (Allman) Kofoid and Swezy (2)
Gymnodinium sp. (1)
Peridinium cinctum Ehrenberg (2, 3)
Peridinium inconspicuum Lemmermann (1)
Peridinium palustre (Lindemann) Lefevre (2)
Peridinium polonicum Wolle (1)
Peridinium willei Huitfeld-Kaas (1, 2)
Peridinium wisconsinense Eddy (2, 3)

BENTHIC MICRO- AND MACROINVERTEBRATES

Protozoa

Amoeba sp.
Colacium sp.
Coleps sp.
Di-qugia sp.
Dileptus sp.
Metopus sp.
Ophrydium sp.
Paramecium sp.
Stentor spp.
Vorticella sp.

Porifera

Anheteromeyenia argyrosperma (Potts)
Ephydatia mulleri (Lieberkuhn)
Eunapiusfragilis (Leidy)
Spongilla lacustris Linnaeus

Coelenterata

Chlorohydra sp.
Hydra americana Hyman

Platyhelminthes

Dugesia sp.
Gyatrix hermaphroditus Ehrenberg
Macrostomum sp.
Mesostoma spp.
Microdalyellia sp.
Microstomum lineare (O. F. Muller)
Myostenostomum sp.
Opisthocystis goetti (Bresslau)
Otomesostoma auditivum (Du Plessis)
Phagocata sp. (?)
Prorhynchella minuta Ruebush
Prorhynchus stagnalis Schultz
Rhynchomesostoma sp.
Rhynchoscolex simplex Leidy
Stenostomum leucops (Duges)
Stenostomum unicolor O. Schmidt
Stenostomum spp.
4 undetermined species

Gastrotricha

Aspidiophorus sp.
Chaetonotus spp.
Ichthydium spp.
Monhystrella sp.
Polymerurus spp.

Rotatoria

Digononta (Class)
Dissotrocha aculeata Ehrenberg
Dissotrocha macrostyla (Ehrenberg)
Hablotrocha spp.
Macrotrachela sp.
Rotaria cf. macrura Ehrenberg
Rotaria rotatoria (Pallas)
Rotaria tridens Montet
Monogononta (Class)

Ascomorpha sp.
Cephalodellaforficula (Ehrenberg)
Cephalodella spp.
Collothea sp.
Colurella spp.
Dicranophorus spp.
Erignatha clastopsis (Gosse)
Gasfropus minor (Rousselet)
Lecane spp.
Lepadella sp.
Macrochaetus spp.
Microcodon clauus Ehrenberg
Monommata astia Myers
Monommata spp.
Notommata spp.
Polyarthra spp.
Proales sp.
Proalinopsis spp.
Scaridium longicaudatum (O.F. Muller)
Stephanoceras fimbriatus (Goldfuss)
Synchaeta sp.
Taphrocampa selenura (Gosse)
Taphrocampa sp.
Testudinella sp.
Tetrasiphon hydracora Ehrenberg
Trichocerca spp.
Trichotria sp.
Wierzejskiella sp.
5 undetermined genera

Nematoda

Achromadora sp.
Alaimus sp.
Anonchus sp.
Aphanolaimus sp.
Criconemoides sp.
Chromadorita sp.
Dorylaimoidea
Ethmolaimus sp.
Ironus sp.
Mermithidae
Monhystera spp.
Monhystrella sp.
Mononchus sp.
Prismatolaimus sp.
Prodesmodora sp.
Rhabdolaimus sp.
Tobrilus sp.
3 undertermined genera

Tardigrada

Dactylobiotus grandipes Schuster et al.
Macrobiotus sp.
Pseudobiotus sp.

Ectoprocta

Eredericella sultana (Blumenbach)
Pectinatella magnifica Leidy
Plumatella fruticosa Allman

Annelida

- Aeolosoma* spp.
- Amphichaeta americana* Chen
- Aulodrilus pigueti* Kowalewski
- Chaetogaster diastrophus* (Gruithuisen)
- Dero digitata* (O. F. Muller)
- Alona rustica* Scott
- Dero obtusa* d'Udekem
- Chydorus bicornutus* Doolittle
- Enchytraeidae
 - Chydorus* nr *brevilabris* Frey
 - Llyodrilus templetoni* (Southern)
 - Limnodrilus hoffmeisteri* Claparede
- Lumbriculidae
 - Nais communis* Pignet
 - Nais simplex* Pignet
 - Piguetiella blanci* (Pignet)
 - Pristina aequiseta* Bourne
 - Pristina leidy* Smith
 - Quistodrilus multisetosus* (Smith)
 - Rhyacodrilus montana* (Brinkhurst)
 - Slavina appendiculata* (d'Udekem)
 - Specaria josinae* (Vejdovsky)
 - Spirosperma nikolskyi* (Lastockin and Sokolskaya)
 - Stylaria lacustris* (Linnaeus)
 - Tubifex tubifex* (O. F. Muller)
 - Uncinais uncinata* (Orsted)
 - Vejdovskyella comata* (Vejdovsky)

Mollusca

- Gastropoda (Class)
 - Campeloma* sp.
 - Helisoma* sp.
 - Lymnaea* sp.
- Pelecypoda (Class)
 - Elliptio complanata* (Lightfoot)
 - Pisidium* sp.
 - Sphaerium* sp.

Arthropoda

- Arachnida (Class)
 - Parasitengona
 - Arrenurus* sp.
 - Forelia* sp.
 - Hygrobates* sp.
 - Lebertia* sp.
 - Limnesia* sp.
 - Piona* sp.
 - Unionicola* sp.
 - Halacaridae
 - Lobohalacar* sp.
 - Porohalacar* sp.
 - Porolohmanella* sp.
 - Soldanellonyx* sp.
 - Oribatida
 - Hydrozetes lacustris* (Michael)
 - Trimalaconothrus novus* (Sellnick)

Crustacea (Class)

- Amphipoda
 - Hyalella azteca* Saussure
- Cladocera
 - Alonella excisa* (Fischer)
 - Alonella nana* (Baird)
 - Alona affinis* (Leydig)
 - Alona* cf. *barbulata* Megard
 - Alona quadrangularis* (O.F. Muller)
 - Chydorus piger* Sars
 - Chydorus* sp.
 - Disparalona acutirostris* (Koch)
 - Eurvcercus longirostris* Hann
 - Ilyocryptus sordidus* (Lieven)
 - Ilyocryptus spinifer* Herrick
 - Latona parviremis* Birge
 - Macrothrix laticornis* (Jurine)
 - Monospilus dispar* Sars
 - Ophryoxus gracilis* Sars
 - Polyphemus pediculus* Linnaeus
 - Rhynchotalona falcata* (Sars)
 - Scapholeberis kingi* Sars
 - Sida crystallina* (O. F. Muller)
- Copepoda
 - Acanthocyclops vernalis* (Fischer)
 - Attheyella obatogamensis* Coker
 - Bryocamptus minutus* group
 - Bryocamptus zschokkei* (Schmeil)
 - Canthocamptus assimilis*
 - Diacyclops nanus* (Sars)
 - Eucyclops agilis* (Koch)
 - Macrocyclus albidus* (Jurine)
 - Mesocyclops edas* Forbes
 - Microcyclops rubellus* (Lillieborg)
 - Microcyclops varicans* (Sars)
 - Paracyclops* sp.
 - Parastenocaris brevipes* Kessler
- Decapoda
 - Orconectes* sp.
- Ostracoda
 - Candona* sp.
 - Cypria turneri* Hoff
 - Darwinula stevensoni* (Brady and Robertson)
- Insecta (Class)
 - Collembola
 - Isotomurus paulustris* Müller
 - Ephemeroptera
 - Caenis* sp.
 - Ephemera* sp.
 - Ephemerella* sp.
 - Heptagenia* sp.
 - Hexagenia* sp.
 - Odonata
 - Argia* sp.
 - Basiaeschna* sp.
 - Cordulia* sp.
 - Dromogomphus* sp.
 - Enallagma* sp.
 - Epiaeschna* sp.
 - Ischnura* sp.

Macromia sp.
Neurocordulia sp.
Megaloptera
Chauliodes sp.
Sialis sp.
Neuroptera
Sisyra sp.
Coleoptera
Bidessus sp.
Dineutus sp.
Donacia sp.
Galerucella sp.
Haliplus sp.
Trichoptera
Agrypnia sp.
Banksiola sp.
Limnephilus sp.
Mystacides sp.
Oecetis sp.
Oxyethira sp.
Phylocentropus sp.
Polycentropus sp.
Triaenodes sp.
Lepidoptera
Eoparargyractis plevie
Hemiptera
Cymatia sp.
Mesovelina sp.
Notonecta sp.
Rheumatobates sp.
Diptera
Tabanidae
Chrysops sp.
Heleidae
Chaoboridae
Chaoborus flauicans Meigen
Chaoborus punctipennis Say
subfamily Chironominae
tribe Chironomini
Chironomus anthracinus Zetterstedt
Chironomus sp.
Cladopelma sp.
Cryptochironomus sp.
Cryptotendipes sp.
Dicrotendipes lobiferus Say
Lauterborniella sp.
Microtendipes sp.
Pagastiella sp.
Parachironomus sp.
Paralauterborniella sp.
Phaenopsectra sp.
Polypedilum haltere Coq.
Polypedilum tritum Walker
Stichtochironomus sp.
tribe Pseudochironomini
Pseudochironomus sp.
tribe Tanytarsini
Cladotanytarsus sp.
Micropsectra sp.
Paratanytarsus sp.
Stempellina sp.

Tanytarsus spp.
subfamily Orthocladiinae
Brillia sp.
Heterotanytarsus sp.
Heterotrissocladius sp.
Parakiefferiella sp. (?)
Psectrocaldius spp.
Rheocricotopus sp.
Zalutschia zalutschicola
Zalutschia spp.
2 undetermined species
subfamily Diamesinae
Protanypus sp.
subfamily Prodiamesinae
Monodiamesa sp.
subfamily Tanypodinae
Ablabesmyia mallochi Walley
Clinotanypus sp.
Labrundinia sp.
Larsia sp.
Procaldius denticulatus Sublette
Procladius sp.

ZOOPLANKTON

Limnetic Zone

Cladocera

Herbivores

Holopedium gibberum
Daphnia catawba
Daphnia ambigua (rare)
Scapholeberis kingi (rare)
Bosmina longirostris

Copepods

Herbivores

Diaptomus minutus
Epischura lacustris (rare)

Omnivores/Predators

Cyclops scutifer
Mesocyclops edax
Macrocyclus albidus (rare)
Tropocyclops prasinus
Cyclops vernalis (rare)

Rotatoria

Herbivores

Epilimnion

Keratella taurocephala
Keratella crassa

Metalimnion

Conochilus unicornis
Keratella cochlearis
Polyarthra vulgaris
Kellicottia longispina

Hypolimnion

Kellicottia bostoniensis
Conochiloides dossuarius

Omnivores/Predators

Asplanchna priodonta
Miscellaneous
Ascomorpha sp. (rare)
Keratella quadrata (rare)

Littoral Zone

Cladocera
Herbivores
Sida crystallina
Latona setifera
Alonella excis
Ophryoxus gracilis
Eurycercus lamellatus ?
Predators
Polyphemus pediculus

FISH

Catostomidae (Sucker family)
Catostomus commersoni (Lacepede) - Common White Sucker (also in HBEF streams).

Centrarchidae (Sunfish family)
Mircopterus dolomieu (Lacepede) - Smallmouth Bass.

Esocidae (Pike family)
Esox niger (LeSueur) - Chain Pickerel.

Ictaluridae (Catfish family)
Ictalurus nebulosus (Le Sueur) - Brown Bullhead, Horned Pout.

Percidae (Perch family)
Perca flavescens (Mitchell) - Yellow Perch.

Salmonidae (Trout family)
Salmo gairdneri - Rainbow Trout.
Salmo trutta - Brown Trout (also in HBEF streams).
Salvelinus fontinalis - Brook Trout (also in HBEF streams).

AMPHIBIANS

Anura

Bufonidae
Bufo americanus - American Toad.

Hylidae
Pseudacris (formerly *Hyla*) *crucifer* - Spring Peeper.

Ranidae
Rana palustris - Pickerel Frog.

Urodela

Salamandridae
Notophthalmus viridescens viridescens - Red-Spotted Newt (also in HBEF)

REPTILES

Chelonia

Chelyridae
Chelydra serpentina - Snapping Turtle

Kinosternidae
Chrysemys picta picta - Eastern Painted Turtle.
Clemmys guttata - Spotted Turtle (also in HBEF).

ACKNOWLEDGMENTS

This compilation was made possible by grants from the National Science Foundation to Dartmouth College and The Institute of Ecosystem Studies. The Hubbard Brook Experimental Forest is operated and maintained by the USDA Forest Service's Northeastern Research Station. The assistance, cooperation, and support of Robert S. Pierce (deceased) and Christopher Eagar are gratefully acknowledged.

REFERENCES

- Anderson, L. E.; Crum, H. A.; Buck, W. R. 1990. **List of the mosses of North America north of Mexico**. Bryologist. 93: 448-499.
- Burton, T. M. 1973. **The role of salamanders in ecosystem structure and function in the Hubbard Brook Experimental Forest in New Hampshire**. Ithaca, NY: Cornell University. Ph.D. dissertation.
- Burton, T. M. 1976. **An analysis of the feeding ecology of the salamanders (Amphibia, Urodela) of the Hubbard Brook Experimental Forest, New Hampshire**. Journal of Herpetology. 10: 187-204.
- DeNoyelles, F.; Likens, G.E. 1985. **Phytoplankton**. In: Likens, G.E., ed. An ecosystem approach to aquatic ecology: Mirror Lake and its environment. New York: Springer-Verlag: 161-175.
- Federer, C. A.; Flynn, L.D.; Martin, C.W.; Hornbeck, J.W.; Pierce, R.S. 1990. **Thirty years of hydrometeorologic data the Hubbard Brook Experimental Forest, New Hampshire**. Gen. Tech. Rep. NE-141. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station.
- Flora of North America Editorial Committee. 1993. **Flora of North America**. Volumes 1 and 2. New York: Oxford University Press.
- Fiance, S. B. 1977. **Distribution and biology of the mayflies and stoneflies of Hubbard Brook, New Hampshire**. Ithaca, NY: Cornell University. M.S. thesis.
- Holmes, R. T. 1990. **The structure of a temperate deciduous forest bird community: variability in time and space**. In: Keast, A., ed. Biogeography and ecology of forest bird communities. The Hague, Netherlands: SPB Academic Publishing: 121-139.
- Holmes, R. T.; Sherry, T.W. 1988. **Assessing population trends of New Hampshire forest birds: local versus regional patterns**. Auk. 105: 756-768.
- Holmes R. T.; Sturges, F.W. 1975. **Bird community dynamics and energetics in a northern hardwoods ecosystem**. Journal of Animal Ecology. 44: 175-200.
- Holmes, R. T.; Sherry, T.W.; Sturges, F.W. 1986. **Bird community dynamics in a temperate deciduous forest: long-term trends at Hubbard Brook**. Ecological Monographs. 56: 201-220.
- Likens, G. E., ed. 1985. **An ecosystem approach to aquatic ecology: Mirror Lake and its environment**. New York: Springer Verlag.
- Likens, P. C. 1997. **Publications of the Hubbard Brook Ecosystem Study**. Millbrook, NY: Institute of Ecosystem Studies.
- Makarowicz, J. C. 1985. **Species composition, distribution, population, biomass, and behavior: zooplankton**. In: Likens, G.E., ed. An ecosystem approach to aquatic ecology: Mirror Lake and its environment. New York: Springer-Verlag: 192-204.
- Moeller, R. E. 1985. **Species composition, distribution, population, biomass, and behavior: macrophytes**. In: Likens, G.E., ed. An ecosystem approach to aquatic ecology: Mirror Lake and its environment. New York: Springer-Verlag: 177-192.
- McConnochie, K.; Likens, G.E. 1969. **Some Trichoptera of the Hubbard Brook Experimental Forest in central New Hampshire**. Canadian Field Naturalist. 83: 147-154.
- Sherman, J. 1985. **Diatoms**. In: Likens, G.E., ed. An ecosystem approach to aquatic ecology: Mirror Lake and its environment. New York: Springer-Verlag: 366-382.
- Strayer, D.L. 1985. **Benthic microinvertebrates**. In: Likens, G.E., ed. An ecosystem approach to aquatic ecology: Mirror Lake and its environment. New York: Springer-Verlag: 228-234.
- Strayer, D. L.; Pletscher, D.H.; Hamburg, S.P.; Nodvin, S.C. 1986. **The effects of forest disturbance on land gastropod communities in northern New England**. Canadian Journal of Zoology. 64: 2094-2098.
- Stotler, R.; Crandall-Stotler, B. 1977. **A checklist of the liverworts and hornworts of North America**. Bryologist. 80: 405-425.
- Thornton, G. A. 1974. **Some effects of deforestation on stream macroinvertebrates**. Ithaca, NY: Cornell University. M.S. thesis.
- Walter, R. A. 1985. **Production and limiting factors: benthic macroinvertebrates**. In: Likens, G.E., ed. An ecosystem approach to aquatic ecology: Mirror Lake and its environment. New York: Springer-Verlag: 280-288.

APPENDIX

Primary Sources for the Organisms Listed in This Report

HUBBARD BROOK VALLEY

Bryophytes

Natalie L. Cleavitt, Cornell University

Vascular Plants

Baldwin, H.P. 1989. The vascular flora of Hubbard Brook Experimental Forest. Unpublished report on file at Plymouth State College, Plymouth, New Hampshire; also, S. Bailey, U.S. Department of Agriculture, Forest Service, Northeastern Research Station, G.E. Crow, University of New Hampshire, P. Vodicka-Asbury, Cornell University, C.W. Martin, U.S. Department of Agriculture, Forest Service, Northeastern Research Station, T. Siccama, Yale University, and L. Teeling, University of New Hampshire.

Insects

D. Kneppshield and T.M. Burton, Michigan State University

Chironomidae

R. Bode, New York Health Department, Albany; Thornton (1974)

Ephemeroptera and Plecoptera

Fiance (1977)

Trichoptera

McConnochie and Likens (1969); Thornton (1974); J. Howe; J.C. Schultz, Pennsylvania State University

Molluscs

Strayer et al. (1986)

Other Invertebrates

D. Kneppshield and T.M. Burton, Michigan State University, and Thornton (1974)

Fish

G.E. Likens, Institute of Ecosystem Studies, and D. Buso, Institute of Ecosystem Studies

Amphibians and Reptiles

Burton (1973, 1976); D. Buso, Institute of Ecosystem Studies, T.M. Burton, Michigan State University, G.E. Likens, Institute of Ecosystem Studies, and R.T. Holmes, Dartmouth College

Birds

Holmes and Sturges (1975); Holmes et al. (1986); Holmes and Sherry (1988); Holmes (1990)

Mammals

R.T. Holmes, Dartmouth College, T.W. Sherry, Tulane University, G.L. Potter, Dartmouth College, E. Horner, Smith College, and C.W. Martin, U.S. Department of Agriculture, Forest Service, Northeastern Research Station

MIRROR LAKE

Hydrophytes

Moeller (1985)

Epipellic Algae

Moeller (1985); D. Strayer, Institute of Ecosystem Studies

Phytoplankton

DeNoyelles and Likens (1985); F. DeNoyelles, University of Kansas, S.K. Holmgren, and P. Godfrey, University of Washington.

Benthic Micro- and Macroinvertebrates

Walter (1985); D. Strayer, Institute of Ecosystem Studies

Zooplankton

Makarewicz (1985)

Fish, Amphibians, and Reptiles

G.E. Likens, Institute of Ecosystem Studies, D. Buso, Institute of Ecosystem Studies

Additional Contributors

A. Bailey, U.S. Department of Agriculture, Forest Service, Northeastern Research Station, F.H. Bormann, Yale University, R. Downes, Dartmouth College, J.S. Eaton (deceased), Institute of Ecosystem Studies, Tim Fahey, Cornell University, R.T.T. Forman, Harvard University, J.R. Gosz, University of New Mexico, P.P. Marra, Dartmouth College, D.J. Mazsa, Cornell University, W.A. Reiners, University of Wyoming, and T.S. Sillett, Dartmouth College.

Holmes, Richard T.; Likens, Gene E., comps. 1999. **Organisms of the Hubbard Brook Valley, New Hampshire**. Gen. Tech. Rep NE-257. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 32 p.

Lists the organisms, both plant and animal, that have been identified by scientists engaged in multidisciplinary ecological research in the Hubbard Brook Valley, New Hampshire, during the past three decades. The Valley encompasses the Hubbard Brook Experimental Forest, Mirror Lake, and nearby areas within the White Mountain region of Grafton County. The species lists included in this report are relatively complete for vascular plants, amphibians, birds, fish, mammals, phytoplankton, and zooplankton, and partially complete for insects, molluscs, and nonvascular plants.

Keywords: biodiversity; northern hardwoods; ecosystem studies; watersheds; Hubbard Brook Experimental Forest; Mirror Lake; streams





Headquarters of the Northeastern Research Station is in Radnor, Pennsylvania. Field laboratories are maintained at:

Amherst, Massachusetts, in cooperation with the University of Massachusetts

Burlington, Vermont, in cooperation with the University of Vermont

Delaware, Ohio

Durham, New Hampshire, in cooperation with the University of New Hampshire

Hamden, Connecticut, in cooperation with Yale University

Morgantown, West Virginia, in cooperation with West Virginia University

Parsons, West Virginia

Princeton, West Virginia

Syracuse, New York, in cooperation with the State University of New York, College of Environmental Sciences and Forestry at Syracuse University

Warren, Pennsylvania

The U. S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at (202)720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue SW, Washington, DC 20250-9410, or call (202)720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

“Caring for the Land and Serving People Through Research”