

Appendix A

Chemical treatments and their pros and cons

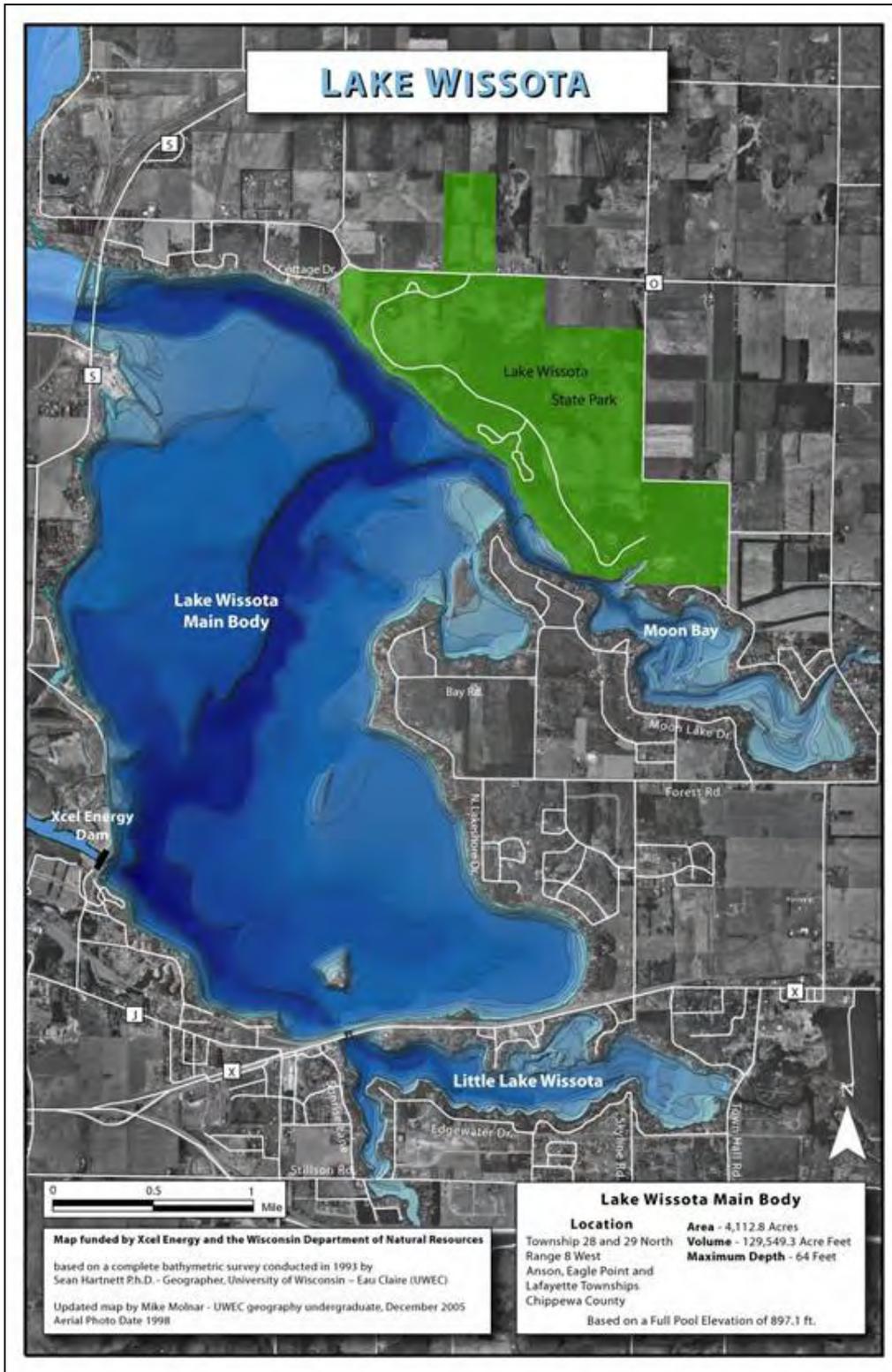
Chemical Treatment	Pros	Cons
2,4-D	Highly effective on EWM	May cause oxygen depletion
	Can be used in synergy with Endothall for early-season treatments	Monocots are not affected, including curly-leaf pondweed
	Comes in granular or liquid form	Toxic to aquatic fauna if applied at improperly high dosage
	Does not affect monocots	
	Can be selective depending on concentration and seasonal timing	
Endothall (Aquathol)	Effective on EWM and CLP	Kills many native pondweeds
	Can be selective depending on concentration and seasonal timing	Not as effective in dense vegetation
	Can be combined with 2,4-D or copper treatments	Toxic to aquatic fauna if applied at improperly high dosage
Diquat (Reward)	Effective on EWM	Broad-spectrum, may impact native pondweeds, Elodea and coontail
	Fast-acting	Toxic to many native plants at the concentration needed to kill EWM
	Limited toxicity to fish and other fauna	Toxic to aquatic invertebrates
		Ineffective in cold or turbid water
		Contact herbicide, does not work as a systemic at label-prescribed rate
Fluridone (Sonar, Avast)	Effective on EWM	EWM has shown elsewhere in the US to develop resistance
	Has minor effect on dissolved oxygen levels	Requires long contact time, which [Moon Bay and Little Lake Wissota] do not have
	Applied at low concentration	Affects many native plants found in [Lake Wissota] at concentration needed to control EWM
	Low toxicity to aquatic fauna	

Chemical treatments and their pros and cons cont'd

Chemical Treatment	Pros	Cons
Glyphosate (Rodeo)	Effective on floating and emergent plants (ie. purple loosestrife)	Ineffective in turbid water
	Non-toxic to most aquatic animals at recommended dosages	No controlling effect on submerged plants
		Contains phosphorous
		Inexpensive terrestrial form (RoundUp) is inappropriate for shorelines due to lethality to herps
Triclopyr (Renovate)	Effective on emergent and floating plants	Negative impact to some native plants
	Results in 3-5 weeks	Breaks down quickly in UV (sun)light
	Low toxicity to aquatic animals	
	No recreational use restrictions following treatment	
Copper Compounds (Cutrine Plus)	Reduces algae growth (increases water clarity)	Copper accumulates and persists in sediment
	No recreational restrictions following treatment	Short-term results (2 weeks)
		Toxicity to invertebrates and fish may be caused after extended use

Appendix B

Map of Lake Wissota, Little Lake Wissota, and Moon Bay from 2005



Appendix C

(Xcel Energy Records) Summary of Lake Wissota Drawdowns From 1966 To 2008 * +

- 2008 Lowered approximately 3 ft. from March 31 to April 5
- 2007 No drawdown
- 2006 No drawdown
- 2005 No drawdown
- 2004 No drawdown
- 2003 No drawdown
- 2002 No drawdown
- 2001 Lowered 3 ft. beginning March 15 and refilled on April 5
- 2000 No drawdown
- 1999 Lowered 9.2 ft. beginning March 16 and refilled on April 1 (for entrainment study)
- 1998 Lake drawdown did not occur due to the lack of snow in upstream watershed.
- 1997 Lowered 12 ft. beginning 2/17/97 and refilled on 3/31/97 (high flood threat).
- 1996 Lowered 10 ft. between 2/12/96 and 4/17/96 (high flood threat).
- 1995 Lowered 5 ft. between 3/1/95 and 3/18/95; (early runoff)
- 1994 Lowered 10 ft. between 2/14/94 and 4/9/94 (macroinvertebrates/drawdown assessment study)
- 1993 Lowered 12 ft. between 2/16/93 and 4/5/93 for inspection of spillway gates.
- 1992 Lowered 5 ft. between 2/19/92 and 3/8/92. Lowered 5 ft. again on 3/17/93 to 4/9/92.
- 1991 Lowered 5 ft. between 3/6/91 and 3/23/91.
- 1990 Lowered 8 ft. between 12/14/89 and 1/10/90 for dam repairs; began refilling on 1/22/90.
- 1989 Lowered 8 ft. between 1/30/89 and 2/17/89 for dam repairs.
- 1988 Lowered 5 ft. beginning first week of March (6"/day)
- 1987 Lowered 5 ft. beginning 2/23/87 (6"/day)
- 1986 Lowered 15 ft. throughout the period 1/1/86 to 3/17/86 (construction drawdown).
- 1985 Began 15 ft. construction drawdown on 12/15/85 at rate of 6"/day. Began 15 ft. spring drawdown on 3/1/85.
- 1984 Began 14.5 ft. spring drawdown on 2/13/84 and completed about 3/25/84.
- 1983 Drawdown information is not available.
- 1982 Drawdown information is not available.
- 1981 Drawdown information is not available.
- 1980 15 ft. drawdown *
- 1979 15 ft. drawdown; 2/26/79 - 4/1/79 **
- 1978 Began 15 ft. spring drawdown on 2/10/78; drawdown was terminated on 4/6/78 (55 days).
- 1977 Began 4 ft. spring drawdown on 3/1/77; drawdown was completed on 3/30/77 (4 days).
- 1976 Began 15 ft. spring drawdown on 1/21/76; drawdown was completed on 3/30/76 (68 days).
- 1975 15 ft. drawdown; 2/10/75 - 3/27/75. **

1974 15 ft. drawdown; 2/11/74 - 3/27/74. **
 1973 14 ft. drawdown; 2/12/73 - 3/27/73. **

1972 15 ft. drawdown; 2/14/72 - 3/27/72. **
 1971 15 ft. drawdown; 2/11/71 - 3/27/71. **
 1970 15 ft. drawdown; 2/9/70 - 3/27/70. **
 1969 15 ft. drawdown (actual)
 1968 7.4 ft. drawdown (actual)

1967 Began 15 ft. drawdown on 2/1/67 for concrete work on piers of spillway. Drawdown continued until 3/27/67. **
 1966 7.8 ft. drawdown (actual).

- * The dates indicate the time that the pond was reduced from below the normal low water level (897.0) until the pond was refilled to the normal low water level at the conclusion of the drawdown.
- ** The dates and the extent of drawdown performed on Lake Wissota was dependent upon snow conditions in the Chippewa and Flambeau River Basins and the timing of spring runoff.
- + This appendix was taken directly from Heuschele, J. 2006. A comparison of the distribution and density of aquatic plants in Lake Wissota, Chippewa County, Wisconsin, between 1989 and 2005. Beaver Creek Reserve Citizen Science Center.

Appendix D

Plants Present in Lake Wissota by Year

1989/90

Emergents (12)

Acorus calamus
Carex crinita
Eleocharis palustris
Leersia oryzoides
Potentilla palustris
Sagittaria latifolia
Sagittaria rigida
Scirpus atrovirens
Scirpus validus
Sparganium sp.
Typha angustifolia
Typha latifolia

Floating-leaf (5)

Lemna minor
Lemna trisulca
Nuphar variegatum
Nymphaea odorata
Spirodela polyrhiza

Submergents (14)

Ceratophyllum demersum
Elatine minima
Elodea canadensis
Najas flexilis
Nitella sp.
Potamogeton crispus
Potamogeton epihydrus
Potamogeton nodosus
Potamogeton pusillus
Potamogeton richardsonii
Potamogeton spirillus
Potamogeton zosteriformis
Vallisneria americana
Zosterella dubia

2005

Emergents (12)

Carex crinita
Eleocharis palustris
Eleocharis acicularis
Leersia oryzoides
Pontederia cordata
Sagittaria latifolia
Sagittaria rigida
Scirpus atrovirens
Scirpus validus
Sparganium sp.
Typha angustifolia
Typha latifolia

Floating-leaf (5)

Lemna minor
Nuphar variegatum
Nymphaea odorata
Spirodela polyrhiza
Wolfia columbiana

Submergents (16)

Ceratophyllum demersum
Elatine minima
Elodea canadensis
Myriophyllum spicatum
Najas flexilis
Nitella sp.
Potamogeton crispus
Potamogeton epihydrus
Potamogeton nodosus
Potamogeton pusillus
Potamogeton richardsonii
Potamogeton spirillus
Potamogeton vaseyi
Potamogeton zosteriformis
Vallisneria americana
Zosterella dubia

2009

Emergents (10)

Carex crinita
Leersia oryzoides
Pontederia cordata
Sagittaria latifolia
Sagittaria rigida
Scirpus validus
Sparganium sp.
Typha angustifolia
Typha latifolia
Zizania sp.

Floating-Leaf (6)

Lemna minor
Lemna trisulca
Nuphar variegatum
Nymphaea odorata
Spirodela polyrhiza
Wolfia columbiana

Submergents (16)

Ceratophyllum demersum
Elodea canadensis
Myriophyllum spicatum
Najas flexilis
Nitella sp.
Potamogeton amplifolius
Potamogeton crispus
Potamogeton epihydrus
Potamogeton nodosus
Potamogeton pusillus
Potamogeton richardsonii
Potamogeton spirillus
Potamogeton zosteriformis
Ranunculus longirostris
Vallisneria americana
Zosterella dubia

Appendix F

Fish Species Collected in Lake Wissota, 1976-2008, by Family

Acipenseridae-Sturgeon Family	
*lake sturgeon [P]	<i>Acipenser fulvescens</i>

Atherinidae-Silverside Family	
brook silverside [P]	<i>Labidesthes sicculus</i>

Catostomidae-Sucker Family	
bigmouth buffalo [R - 1976]	<i>Ictiobus cyprinellus</i>
golden redhorse [C]	<i>Moxostoma erythrurum</i>
**greater redhorse [U - 1994]	<i>Moxostoma valenciennesi</i>
northern hogsucker [P]	<i>Hypentelium nigricans</i>
quillback [R]	<i>Carpionodes cyprinus</i>
shorthead redhorse [C]	<i>Moxostoma macrolepidotum</i>
silver redhorse [A]	<i>Moxostoma anisurum</i>
white sucker [P]	<i>Catostomus commersonii</i>

Centrarchidae-Sunfish and Bass Family	
largemouth bass [P]	<i>Micropterus salmoides</i>
smallmouth bass [C]	<i>Micropterus dolomieu</i>
black crappie [A]	<i>Pomoxis nigromaculatus</i>
bluegill [A]	<i>Lepomis macrochirus</i>
green sunfish [P]	<i>Lepomis cyanellus</i>
pumpkinseed [P]	<i>Lepomis gibbosus</i>
rock bass [P]	<i>Ambloplites rupestris</i>
warmouth [R - 2006]	<i>Lepomis gulosus</i>

Esocidae-Pike Family	
muskellunge [C]	<i>Esox masquinongy</i>
northern pike [C]	<i>Esox lucius</i>

Gadidae-Freshwater Cod Family	
burbot [U]	<i>Lota lota</i>

Ictaluridae-Catfish Family	
channel catfish [C]	<i>Ictalurus punctatus</i>
flathead catfish [C]	<i>Pylodictis olivaris</i>
black bullhead [P]	<i>Ameiurus melas</i>
yellow bullhead [P]	<i>Ameiurus natalis</i>
***slender madtom [U - 2005]	<i>Noturus exilis</i>

Percidae-Perch Family	
blackside darter [U - 2005]	<i>Percina maculata</i>
fantail darter [U]	<i>Etheostoma flabellare</i>
iowa darter [U - 1994]	<i>Etheostoma exile</i>
johnny darter [U]	<i>Etheostoma nigrum</i>
logperch [U]	<i>Percina caprodes</i>
walleye [A]	<i>Sander vitreus</i>
yellow perch [A]	<i>Perca flavescens</i>

Percopsidae-Troutperch Family	
troutperch [C]	<i>Percopsis omiscomaycus</i>

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Fish Species Collected in Lake Wissota, 1976-2008, by Family cont'd

Cyprinidae-Minnow family	
blacknose shiner [U - 2005]	<i>Notropis heterolepis</i>
bluntnose minnow [U - 1994]	<i>Pimephales notatus</i>
common carp [P]	<i>Cyprinus carpio</i>
common shiner [P]	<i>Luxilus cornutus</i>
creek chub [R]	<i>Semotilus atromaculatus</i>
emerald shiner [A]	<i>Notropis atherinoides</i>
	<i>Notemigonus</i>
golden shiner [C]	<i>crysoleucas</i>
hornyhead chub [U - 1994]	<i>Nocomis biguttatus</i>
largescale stoneroller [U - 1994]	<i>Campostoma oligolepis</i>
longnose dace [U - 1994]	<i>Rhinichthys cataractae</i>
river shiner [U - 1976]	<i>Notropis blennioides</i>
spotfin shiner [U]	<i>Cyprinella spiloptera</i>

Umbridae-Mudminnow Family	
central mudminnow [U - 1994]	<i>Umbra limi</i>

A = abundant
 C = common
 P = present
 R = rare
 U = unknown status

*Lake sturgeon is listed as a species of concern in Wisconsin.
**Greater redhorse is listed as a threatened species in Wisconsin.
***Slender madtom is listed as an endangered species in Wisconsin. Question the identification of this individual, since the northern part of its range is in southern Wisconsin. Suspect it was a stonecat.