TABLES

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Table 1.–Lengths of streams in the Ontonagon River watershed. Distances were measured from digital versions of 1:100,000 scale maps using ArcView GIS software (National Hydrography Dataset 1999).

Subwatershed stream name	Stream length (miles)
Middle Branch Main Stem—upper	43.1
Unnamed tributary	2.0
Unnamed tributary	1.9
Aho Creek	2.3
Deadman Creek & tributaries	4.7
Interior Creek	4.2
McGinty Creek	6.4
Tamarack River	23.7
Morrison Creek	2.5
Marion Creek	1.8
Perch Lake outlet	0.6
Boniface Creek	2.1
Sargents Creek	1.4
Duck Creek & tributaries	10.5
Henderson Creek & tributaries	4.7
Zigzag Creek	1.7
Wolf Creek & tributaries	3.8
Marathon Creek & tributaries	7.6
Total	125.0
Middle Branch Main Stem—lower	24.9
Spring Creek & tributaries	13.1
Baltimore River & tributaries	91.3
Unnamed tributary	1.6
Unnamed tributary	7.2
Unnamed tributary	1.5
Unnamed tributary	1.8
Unnamed tributary	1.6
Unnamed tributary	2.3
Unnamed tributary	1.5
Unnamed tributary	1.1
Trout Creek & tributaries	49.3
Unnamed tributary	1.5
Meto Creek	1.3
Tom Creek & tributaries	4.0
Payne Creek & tributaries	4.5
Total	208.5
Ontonagon River Main Stem	24.0
Unnamed tributary	5.7
Unnamed tributary	3.1
Unnamed tributary	1.9
Unnamed tributary	2.1
Unnamed tributary	1.9
Sucker Creek & tributaries	5.8

Table 1.–Continued.

Subwatershed stream name	Stream length (miles)
Ontonagon River Main Stem – continued	
Unnamed tributary	1.1
Gates Creek & tributaries	3.3
Unnamed tributary	2.8
Austin Creek	1.5
Unnamed tributary	2.2
Mill Creek & tributaries	19.7
Total	75.1
East Branch Main Stem	53.5
Deer Lick Creek & tributaries	7.3
Unnamed tributary	6.1
Adventure Creek & tributaries	20.7
Newholm Creek & tributaries	45.2
Bond Creek & tributaries	6.5
Unnamed tributary	1.3
Unnamed tributary	2.0
Porterfield Creek & tributaries	9.4
Unnamed tributary	3.4
Unnamed tributary	1.4
Kits Creek & tributaries	7.3
Unnamed tributary	2.6
Unnamed tributary	1.3
Unnamed tributary	2.1
Unnamed tributary	2.0
Onion Creek & tributaries	22.3
Unnamed tributary	0.9
Unnamed tributary	0.7
Debutant Creek & tributaries	2.8
Unnamed tributary	0.5
Beaver Creek & tributaries	32.4
Jumbo River & tributaries	40.2
Unnamed tributary	1.2
Unnamed tributary	1.8
Unnamed tributary	2.0
Spargo Creek	7.2
Stony Creek & tributaries	16.0
Smith Creek & tributaries	13.0
Johns Creek	4.4
Glitter Creek	3.6
Preston Creek & tributaries	2.6
Total	323.7
Cisco Branch Main Stem	30.9
Ratford Creek & tributaries	3.0
Custer Creek	1.2
Twomile Creek & tributaries	26.5

Table 1.–Continued.

Subwatershed stream name	Stream length (miles)
Cisco Branch Main Stem – continued	
Snuffbox Creek & tributaries	4.4
Unnamed tributary	1.8
Unnamed tributary	1.3
Tenderfoot Creek & tributaries	23.3
Grosbeck Creek	4.2
Unnamed tributary	1.2
Unnamed tributary	1.1
Langford Creek	1.8
Helen Creek & tributaries	3.7
Spring Creek & tributaries	4.2
Unnamed tributary	2.2
Unnamed tributary	0.2
Total	111.0
South Branch Main Stem	32.4
Unnamed tributary	1.4
Unnamed tributary	1.6
Farmer Creek & tributaries	5.2
Unnamed tributary	1.4
Unnamed tributary	1.7
Unnamed tributary	1.2
Unnamed tributary	2.6
Unnamed tributary	1.4
Cedar Creek & tributaries	14.9
Unnamed tributary	1.1
Unnamed tributary	1.2
Kostlenick Creek	4.1
Unnamed tributary	1.3
Unnamed tributary	1.6
Unnamed tributary	1.2
Sucker Creek & tributaries (including Bond Falls Canal)	67.5
Tenmile Creek & tributaries	83.5
Total	225.3
West Branch Main Stem	34.7
Victoria Bypass	1.6
Cushman Creek	1.1
Erickson Creek	3.7
Schaat Creek & tributaries	4.8
Johnson Creek	4.7
Gleason Creek	1.5
Whiskey Hollow Creek	1.7
Woodpecker Creek & tributaries	7.9
Mill Creek & tributaries	46.9
Cascade Creek & tributaries	31.1
Unnamed tributary	1.3

Table 1.–Continued.

Subwatershed stream name	Stream length (miles)
West Branch Main Stem – continued	
Trestle Creek	1.4
Stindt Creek	1.8
Unnamed tributary	0.8
Knute Creek	3.0
Merriweather Creek & tributaries	12.7
Hendrick Creek	3.1
Bingham Creek	3.4
Gillis Creek	1.3
Marshall Creek & tributaries	6.9
Slate River & tributaries	29.0
Trout Brook & tributaries	14.0
Montgomery Creek & tributaries	3.6
Total	222.0
Watershed total	1,290.6

Table 2.–Lakes with a surface area ≥10 acres in the Ontonagon River watershed.

Segment Lake	County	Latitude	Longitude	Acreage
Middle Branch—upper				
Albino Lake	Gogebic	46.26110	89.26260	16.6
Allen Lake	Gogebic	46.22498	89.17232	76.6
Anderson Lake	Gogebic	46.21387	89.14593	80.8
Bass Lake	Gogebic	46.30498	89.17427	183.4
Beaver Dam Lake	Gogebic	46.24110	89.17232	15.6
Beaver Pond	Gogebic	46.24259	89.08241	24.0
Beaver Station Lake	Gogebic	46.23332	89.17510	24.5
Bluegill Lake	Gogebic	46.30303	89.02470	10.4
Bond Falls Flowage	Ontonagon	46.39443	89.10343	2,080.1
Buck Lake	Gogebic	46.31998	89.10927	19.0
Camp Lake	Ontonagon	46.39809	89.05469	17.1
Castle Lake	Gogebic	46.31526	89.07371	30.4
Clark Lake	Gogebic	46.22498	89.31677	853.7
Clear Lake	Gogebic	46.24925	89.27221	35.3
Corey Lake	Gogebic	46.23203	89.29787	22.2
Crooked Lake	Gogebic	46.23332	89.29177	612.6
Damon Lake	Gogebic	46.26928	89.37784	109.7
Dellies Lake	Gogebic	46.24206	89.14415	11.1
Devils Head Lake	Gogebic	46.21387	89.24177	94.2
Dinner Lake	Gogebic	46.19998	89.13565	107.7
Doyle Lake	Gogebic	46.25368	89.28705	10.1
Duck Lake	Gogebic	46.20832	89.21677	609.6
East Bear Lake	Gogebic	46.24165	89.25427	39.5
Englesby Lake	Gogebic	46.27498	88.99593	39.3
Fleury Lake	Gogebic	46.23332	89.15010	10.1
Germain Lake	Gogebic	46.21315	89.26567	14.8
Hattie Lake	Gogebic	46.25693	89.36954	22.0
Helen Lake	Gogebic	46.24374	89.34077	67.7
High Lake	Gogebic	46.23748	89.27788	64.5
Hilltop Lake	Gogebic	46.24052	89.23378	18.0
Hoist Lake	Gogebic	46.18332	89.15843	32.9
Horseshoe Lake	Gogebic	46.25415	89.06677	58.8
Imp Lake	Gogebic	46.21665	89.07510	89.0
Jennings Lake	Gogebic	46.24026	89.20149	22.2
Joyce Lake	Gogebic	46.29443	89.27093	23.0
Katherine Lake	Gogebic	46.24026	89.31260	38.3
Kvidera Lake	Gogebic	46.23136	89.17006	31.9
Lindsley Lake	Gogebic	46.21804	89.42788	155.6
Little Duck Lake	Gogebic	46.22615	89.22754	43.2
Lumberjack Lake	Gogebic	46.25109	89.14490	20.5
Marion Lake	Gogebic	46.26387	89.08760	295.8
Mountain Lake	Gogebic	46.23054	89.25982	105.3
Ogima Lake	Gogebic	46.28973	89.27369	89.7
Partridge Lake	Gogebic	46.25415	89.30704	12.1
Perch Lake	Gogebic	46.31110	89.10427	82.0
Porcupine Lake	Gogebic	46.25832	89.23899	30.9

Table 2.–Continued.

Segment Lake	County	Latitude	Longitude	Acreage
Middle Branch—upper – continued				
Powwow Lake	Gogebic	46.24304	89.11954	53.4
Rickles Lake	Gogebic	46.24928	89.21191	14.6
Schneider Lake	Gogebic	46.25137	89.13482	37.1
Shadow Lake	Gogebic	46.22776	89.15565	21.3
Slope Lake	Gogebic	46.26665	89.11538	10.4
Snap Jack Lake	Gogebic	46.24721	89.35565	49.9
Sun Lake	Gogebic	46.24304	89.10010	32.4
Tamarack Lake	Iron	46.24739	88.98586	335.5
Taylor Lake	Gogebic	46.24276	89.04093	106.5
Temple Lake	Ontonagon	46.33998	89.05482	13.8
Tomassi Lake	Gogebic	46.25276	89.05704	27.4
Trail Lake	Gogebic	46.24721	89.23065	19.5
Trapper Lake	Gogebic	46.21351	89.25565	13.3
Twist Lake	Gogebic	46.17915	89.20288	18.5
Unnamed Lake	Iron	46.34598	88.98981	11.6
Unnamed Lake	Ontonagon	46.35986	89.00848	12.4
Unnamed Lake	Gogebic	46.26374	89.18557	12.6
Unnamed Lake	Gogebic	46.27464	89.01400	12.9
Unnamed Lake	Ontonagon	46.34688	89.09784	14.6
Unnamed Lake	Gogebic	46.24613	89.26056	18.5
Unnamed Lake	Gogebic	46.22136	89.00866	18.8
Unnamed Lake	Gogebic	46.29544	89.07419	24.0
Unnamed Lake	Ontonagon	46.39372	89.07166	27.2
West Bear Lake	Gogebic	46.24165	89.26260	63.0
Wilson Lake	Gogebic	46.20693	89.15843	30.6
Wilson Springs	Gogebic	46.18379	89.18376	15.8
Wolf Lake	Gogebic	46.29721	89.28760	248.1
Middle Branch—lower				
Erickson Lake	Ontonagon	46.45054	89.17038	17.1
Mattie Lake	Ontonagon	46.43248	89.06427	11.9
Main Stem				
Unnamed Lake	Ontonagon	46.78109	89.29055	16.1
East Branch				
Balcomb Lake	Iron	46.38387	88.95427	10.9
Bela Lake	Iron	46.37637	88.93343	64.3
Bender Lake	Houghton	46.59137	88.82538	12.6
Bob Lake	Houghton	46.66582	88.90871	129.0
Burns Lake	Houghton	46.34026	89.06899	13.3
Clear Lake	Iron	46.36915	88.95121	11.1
Crystal Lake	Houghton	46.50248	88.76177	16.6
Dog Lake	Iron	46.38276	88.73815	18.0
Dunn Lake	Iron	46.41637	88.84204	25.0
Echo Lake	Houghton	46.61248	88.84760	48.7
Gasley Lake	Iron	46.39990	88.75204	21.5
Glare Lake	Iron	46.40832	88.77649	10.4

Table 2.–Continued.

Segment Lake	County	Latitude	Longitude	Acreage
East Branch – continued				
Glitter Lake	Iron	46.41221	88.77565	25.0
Hager Lake	Houghton	46.46471	88.71815	41.5
Jingle Lake	Iron	46.39688	88.73342	29.7
Kunze Lake	Houghton	46.43899	88.72538	14.6
LaCrosse Lake	Iron	46.39776	88.76149	12.6
Lake On-three	Iron	46.42169	88.79440	28.7
Lake Thirteen	Houghton	46.46748	88.75371	73.1
Lewis Lake	Iron	46.38554	88.90149	26.7
Lower Dam Lake	Houghton	46.45203	88.78268	17.0
Maggie Lake	Houghton	46.42721	88.88843	18.5
Markey Lake	Houghton	46.57276	88.78232	47.9
McPherson Lake	Iron	46.37341	88.95568	24.2
Papoose Lake	Iron	46.37776	88.81815	30.6
Pathic Lake	Iron	46.40415	88.80565	16.6
Pine Lake	Houghton	46.57713	88.79584	12.1
Richard Lake	Houghton	46.58915	88.80593	10.1
Tepee Lake	Iron	46.38528	88.87804	121.8
Tinsel Lake	Iron	46.36161	88.98242	15.8
Unnamed Lake	Houghton	46.70555	88.91185	10.1
Unnamed Lake	Houghton	46.51234	88.97815	11.1
Unnamed Lake	Iron	46.39938	88.71739	32.9
Upper Dam Lake	Houghton	46.42708	88.74425	30.9
Cisco Branch				
Bay Lake	Gogebic	46.24369	89.48769	168.5
Beatons Lake	Gogebic	46.32804	89.36621	317.5
Benny Lake	Vilas	46.17227	89.45043	34.6
Bergner Lake	Gogebic	46.24582	89.51260	42.0
Big Lake	Vilas	46.20998	89.44399	771.0
Big African Lake	Gogebic	46.25163	89.39812	85.5
Big Mosquito Lake	Gogebic	46.24617	89.47046	13.8
Blair Lake	Ontonagon	46.34943	89.35704	15.3
Brown Lake	Gogebic	46.21665	89.47371	70.7
Cisco Lake	Gogebic	46.24165	89.44593	506.0
Clearwater Lake	Gogebic	46.25693	89.40982	173.5
Cleveland Lake	Vilas	46.17178	89.42785	34.6
Cloverleaf Lake	Gogebic	46.25520	89.45584	58.6
Cochran Lake	Vilas	46.18784	89.51652	125.8
Coffee Lake	Vilas	46.17275	89.46675	20.8
Cornelia Lake	Gogebic	46.26804	89.50288	13.6
Cox Lake	Gogebic	46.24165	89.42510	31.9
Crampton Lake	Vilas	46.20905	89.47091	65.2
Dalzell Lake	Vilas	46.19498	89.47474	24.0
Deadwood Lake	Vilas	46.20324	89.47513	24.2
Deeryard Lake	Gogebic	46.26665	89.44038	15.1
Devils Lake	Vilas	46.17407	89.52133	18.3
Dream Lake	Gogebic	46.20693	89.37510	24.5

Table 2.–Continued.

Segment Lake	County	Latitude	Longitude	Acreage
Cisco Branch – continued				
Dutch Lake	Gogebic	46.21387	89.45982	18.5
East Bay Lake	Gogebic	46.20276	89.40704	276.9
Emeline Lake	Gogebic	46.23887	89.47927	122.1
Erwin Lake	Vilas	46.16283	89.44726	13.6
Fishhawk Lake	Gogebic	46.21665	89.41677	77.1
Forest Lake	Vilas	46.14838	89.37807	461.6
Grace Lake	Gogebic	46.24721	89.46260	43.7
Gray Lake	Gogebic	46.22221	89.45010	46.2
Guides Lake	Gogebic	46.23918	89.45968	23.2
Hardin Lake	Vilas	46.17131	89.41284	63.0
Hartley Lake	Gogebic	46.32498	89.39177	23.0
Hay Lake	Gogebic	46.21387	89.33065	11.9
Helen Lake	Vilas	46.17989	89.42355	99.3
Indian Lake	Gogebic	46.21110	89.38482	94.6
Inkpot Lake	Vilas	46.18230	89.33511	11.9
Inkpot Lake	Gogebic	46.22776	89.50704	16.8
Jane Lake	Gogebic	46.21943	89.44177	18.3
Johnston Springs	Gogebic	46.19026	89.34371	12.1
Jones Lake	Vilas	46.18166	89.51723	53.9
Kickapoo Lake	Gogebic	46.22498	89.49788	13.1
Kinwamakwad Lake	Gogebic	46.23583	89.50222	19.5
Lake of the Woods	Vilas	46.15809	89.35475	14.8
Langford Lake	Gogebic	46.27498	89.47927	463.1
Little African Lake	Gogebic	46.25276	89.40427	20.5
Little Beatons Lake	Gogebic	46.33748	89.37371	73.4
Little Langford Lake	Gogebic	46.27498	89.49454	14.6
Long Lake	Gogebic	46.24165	89.36677	172.2
Mamie Lake	Gogebic	46.19165	89.38899	300.0
Merrill Lake	Vilas	46.16050	89.36217	22.7
Misty Lake	Gogebic	46.25274	89.48224	12.6
Moccasin Lake	Gogebic	46.23471	89.51260	15.3
Morley Lake	Gogebic	46.21387	89.43343	59.0
Morris Lake	Gogebic	46.25693	89.52093	12.6
Mule Lake	Gogebic	46.21804	89.38482	35.6
Palmer Lake	Vilas	46.19945	89.49973	649.9
Plum Lake	Gogebic	46.22360	89.50843	213.3
Poor Lake	Gogebic	46.21248	89.40427	98.1
Record Lake	Gogebic	46.25276	89.38760	68.3
Siskin Lake	Gogebic	46.21943	89.36954	10.4
Spider Lake	Gogebic	46.25415	89.46677	29.7
Spring Lake	Vilas	46.17624	89.35586	207.8
Tenderfoot Lake	Gogebic	46.22352	89.52581	443.3
Thousand Island Lake	Gogebic	46.22915	89.40010	1,078.0
Unnamed Lake	Vilas	46.20607	89.50858	11.4
West Bay Lake	Gogebic	46.20415	89.42788	283.0
Whitefish Lake	Gogebic	46.20832	89.35010	490.5

Table 2.–Continued.

Segment Lake	County	Latitude	Longitude	Acreage
South Branch				
Beaver Pond	Ontonagon	46.35230	89.16469	22.5
Brush Lake	Gogebic	46.32776	89.23760	20.5
County Line Lake	Ontonagon	46.33332	89.27510	62.3
Crane Lake	Gogebic	46.32082	89.30427	64.3
Deadman Lake	Ontonagon	46.33526	89.12232	46.0
Deer Lake	Ontonagon	46.37165	89.25038	12.4
Ox Yoke Lake	Gogebic	46.31928	89.28173	15.8
Pan Lake	Gogebic	46.31546	89.28816	18.8
Sand Lake	Ontonagon	46.38887	89.12371	12.9
Steusser Lake	Ontonagon	46.45304	89.25038	32.4
Sucker Lake	Gogebic	46.30370	89.25364	435.4
Unnamed Lake	Ontonagon	46.35026	89.13298	10.9
Unnamed Lake	Ontonagon	46.34910	89.20777	10.9
Unnamed Lake	Ontonagon	46.33455	89.21721	11.9
West Branch				
Banner Lake	Gogebic	46.32943	89.61288	27.4
Barb Lake	Gogebic	46.32693	89.58954	63.0
Cup Lake	Gogebic	46.38054	89.49177	88.2
Lake Gogebic	Ontonagon	46.49998	89.58343	13,048.1
Sun Dance Lake	Gogebic	46.35832	89.64454	55.9
Victoria Reservoir	Ontonagon	46.68695	89.23102	279.7
Weidman Lake	Ontonagon	46.64804	89.56732	27.4

Table 3.–Archaeological sites within the Ontonagon River watershed (B. Mead, Michigan Department of State, Office of the State Archaeologist, personal communication).

County Township(s)	Township coordinates	Number of archeological sites
Gogebic		
Watersmeet	T44N, R38W	7
Watersmeet	T44N, R39W	9
Watersmeet	T44N, R40W	0
Watersmeet	T44N, R41W	2
Watersmeet	T45N, R38W	37
Watersmeet	T45N, R39W	36
Watersmeet	T45N, R40W	18
Watersmeet	T45N, R41W	21
Marenisco	T45N, R42W	6
Marenisco	T45N, R43W	0
Marenisco	T46N, R41W	10
Marenisco	T46N, R42W	17
Marenisco	T46N, R43W	1
Marenisco	T47N, R41W	5
Marenisco	T47N, R42W	9
Marenisco	T47N, R43W	4
Houghton		
Duncan	T47N, R35W	7
Duncan	T47N, R36W	32
Duncan	T47N, R37W	36
Duncan	T48N, R36W	16
Duncan	T48N, R37W	13
Laird	T49N, R36W	10
Laird	T49N, R37W	28
Iron		
Stambaugh	T45N, R37W	8
Bates	T46N, R35W	1
Bates	T46N, R36W	7
Iron River	T46N, R37W	20
Ontonagon		
Interior	T46N, R38W	13
Haight	T46N, R39W	21
Haight	T46N, R40W	14
Interior	T47N, R38W	19
Haight	T47N, R39W	7
McMillan	T47N, R40W	20
Interior—Stannard	T48N, R38W	13
Stannard	T48N, R39W	0
McMillan	T48N, R40W	0
Matchwood	T48N, R41W	0
Bergland—Matchwood	T48N, R42W	8
Bergland	T48N, R43W	8
Stannard	T49N, R38W	16

Table 3.–Continued.

County Township(s)	Township coordinates	Number of archeological sites
Ontonagon – continued		
Stannard	T49N, R39W	12
Rockland—Matchwood	T49N, R40W	12
Matchwood	T49N, R41W	23
Bergland—Matchwood	T49N, R42W	13
Bergland	T49N, R43W	7
Bohemia	T50N, R37W	13
Greenland	T50N, R38W	3
Rockland	T50N, R39W	32
Ontonagon—Rockland	T50N, R40W	6
Ontonagon	T50N, R41W	5
Carp Lake	T50N, R42W	0
Greenland	T51N, R38W	0
Ontonagon—Rockland	T51N, R39W	2
Ontonagon	T51N, R40W	0
Ontonagon	T52N, R39W	10
Ontonagon	T52N, R40W	12
Total		649

Table 4.–Permeability and relative abundance of the various surficial materials found within the Ontonagon River watershed.

Material	Percent of watershed
High permeability	
Coarse-textured glacial till	16.9
End moraines of coarse-textured till	35.8
Glacial outwash sand, gravel, and postglacial alluvium	6.7
Medium permeability	
Lacustrine sand and gravel	4.3
Low permeability	
Fine-textured glacial till	0.6
Lacustrine clay and silt	33.8
Peat and muck	1.1
Thin to discontinuous till over bedrock	0.8

Table 5.–United States Geological Survey gauging stations used to monitor stream flows in the Ontonagon River watershed.

Subwatershed name, number, river, and location	Latitude Longitude	Period of record	Median discharge (ft^3/s)	(ft^3/s)	Watershed area (mi^2)	Mean yield ($ft^3 \cdot s^{-1} \cdot mi^{-2}$)
Middle Branch—upper						
1 Middle Branch Paulding	46.35694 89.07722	1942–2004	128	170	164	1.03
2 Middle Branch Trout Creek	46.47778 89.09028	1942–2004	50	66	203	0.33
Main Stem						
3 Ontonagon Above West Branch	46.69917 89.16000	1942–2004	289	514	671	0.77
4 Ontonagon Below West Branch	46.72083 89.20694	1942–2004	868	1,380	1,340	1.03
East Branch						
5 East Branch Mass City	46.69000 89.07333	1942–1979	165	257	272	0.94
Cisco Branch						
6 Cisco Branch Cisco Lake	46.25333 89.45139	1944–2004	36	46	51	0.90
South Branch						
7 South Branch Ewen	46.53278 89.27694	1942–1971	350	494	348	1.42
8 Bond Falls Canal Paulding	46.39917 89.14639	1942–2004	127	134	NA	NA
West Branch						
9 West Branch Bergland	46.58750 89.54167	1942–2004	125	170	162	1.05

Table 6.–Low flow (90% exceedence), median flow (50% exceedence), high flow (10% exceedence), low flow yield and high flow yield at United States Geological Survey gauging stations within the Ontonagon River watershed. Exceedence refers to the probability of a discharge exceeding a given value. Ratios of high flow to low flow for other Michigan streams are included for comparison.

Stream Location	Period of record	Median flow (ft^3/s)	Low flow (ft^3/s)	Low flow yield ($ft^3 \cdot s^{-1} \cdot mi^{-2}$)	High flow (ft^3/s)	High flow yield ($ft^3 \cdot s^{-1} \cdot mi^{-2}$)	High flow/ low flow
Middle Branch Ontonagon River							
Paulding	1942–2004	128	88.0	0.54	291	1.77	3.31
Trout Creek	1942–2004	50	44.0	0.22	72	0.35	1.64
Ontonagon River							
Above West Branch	1942–2004	289	208.0	0.31	1,010	1.51	4.86
Below West Branch	1942–2004	868	500.0	0.37	2,740	2.04	5.48
East Branch Ontonagon River							
Mass City	1942–1979	165	115.0	0.42	500	1.84	4.35
Cisco Branch Ontonagon River							
Cisco Lake Outlet	1944–2004	36	0.9	0.02	103	2.03	101.58
South Branch Ontonagon River							
Ewen	1942–1971	350	204.0	0.59	906	2.60	4.44
Bond Falls Canal							
Paulding	1942–2004	127	5.5	NA	294	NA	53.45
West Branch Ontonagon River							
Bergland	1942–2004	125	8.4	0.05	366	2.26	43.57
North Branch Kawkawlin River							
Kawkawlin							1,768.32
White River							
Whitehall							2.81
Au Sable River							
Grayling							1.94

Table 7.–Definition of flow stability indices using the ratio of high flow yield (10% exceedence) to low flow yield (90% exceedence). Data from P. Seelbach, Michigan Department of Natural Resources, Fisheries Division.

Flow index (high flow/low flow)	Classification	Description
1.0–2.0	Very good	Typical of self-sustaining trout streams
2.1–5.0	Good	Better warmwater rivers
5.1–10	Fair	Somewhat flashy warmwater rivers
>10	Poor	Very flashy warmwater rivers

Table 8.–Number of stream crossings, by county, for the Ontonagon River watershed (MIRIS Base Data 1998).

Stream crossings	County					Total
	Gogebic	Houghton	Iron	Ontonagon	Vilas	
County roads	63	54	6	175	2	300
Highways	19	6	0	47	0	72
Streets	2	0	0	12	7	21
Trails	21	15	3	79	0	118
Railroads	36	11	1	49	0	97
Powerlines	1	0	0	0	0	1
Pipelines	24	11	0	18	0	53
Total	166	97	10	380	9	662

Table 9.–Stream gradient classes and associated fish habitat rankings and channel characteristics (G. Whelan, MDNR, Fisheries Division, personal communication).

Gradient class	Fish habitat	Channel characteristics
0–2.9 ft/mi	poor	mostly run habitat with nearly uniform depths and velocities
3.0–4.9 ft/mi	fair	some riffles with low variability of depths and velocities
5.0–9.9 ft/mi	good	irregular riffle-pool sequences with moderate variability of depths and velocities
10.0–69.9 ft/mi	excellent	regular riffle-pool sequences with high variability of depths and velocities
70.0–149.9 ft/mi	fair	chute and pool habitats with moderate variability of depths and velocities
>150 ft/mi	poor	falls and rapids with low variability of depths and velocities

Table 10.–Measured and expected channel widths for United States Geological Survey gauge sites in the Ontonagon River watershed. Number references gauge site in Figure 7. Measured channel widths outside of the expected range are marked with an asterisk (*). Width and discharge (Q, ft^3/s) measurements were used to calculate expected width with the following formulas.

Lower 95% width = $10^{(0.662895 + 0.471522*\log_{10}(Q))}$
Expected mean width = $10^{(0.741436 + 0.498473*\log_{10}(Q))}$
Upper 95% width = $10^{(0.819976 + 0.525423*\log_{10}(Q))}$

Subwatershed name, number, river, and location	Width (ft)	Mean discharge (ft^3/s)	Lower 95% width (ft)	Expected mean width (ft)	Upper 95% width (ft)
Middle Branch—upper					
1 Middle Branch Paulding	45*	170	52	71	98
2 Middle Branch Trout Creek	48	66	33	45	60
Main Stem					
3 Ontonagon Above West Branch	111	514	87	124	176
4 Ontonagon Below West Branch	139	1,340	139	203	295
East Branch					
5 East Branch Mass City	69	257	63	88	122
Cisco Branch					
6 Cisco Branch Cisco Lake	33	46	28	37	49
South Branch					
7 South Branch Ewen	99	494	86	121	172
8 Bond Falls Canal Paulding	28*	134	46	63	87
West Branch					
9 West Branch Bergland	71	170	52	71	98

Table 11.–Registered dams in the Ontonagon River watershed. Number references dam location in Figure 40. Dam purpose: hydroelectric (H), recreation (R), or other (O). Hazard type: 1 = high, 2 = significant, and 3 = low. High hazard means loss of life would occur if the dam failed, and significant hazard means large amounts of property damage would occur.

Subwatershed name, number, dam name, and stream	Date built	Current purpose	Owner	Height (ft)	Surface acres	Storage (acre-ft)	Mean depth (ft)	Hazard rating
Middle Branch—upper								
1 Bond Falls Dam Middle Branch Ontonagon River	1938	H	UPPCo	50	2,160	36,000	16.7	1
2 Bond Falls Control Dam Middle Branch Ontonagon River	1938	H	UPPCo	40	2,160	36,000	16.7	1
3 Wolf Lake Dam Wolf Lake Creek	1965	R	Private	14	250	468	1.9	3
Middle Branch—lower								
4 Calderwood Pond Dam West Branch Trout Creek	1982	O	USFS	11	13	86	6.6	3
5 Trout Creek Dam Trout Creek	1899	R	Township	12	6	34	5.7	2
East Branch								
6 Lower Dam East Branch Ontonagon River	1965	R	USFS	23	17	180	10.6	3
7 Nordine Dam Walton Creek	1970	R	Private	9	26	65	2.5	3
Cisco Branch								
8 Beatons Lake Dam Tributary to Twomile Creek	1988	O	MDNR	3	323			3
9 Cisco Dam Cisco Branch Ontonagon River	1931	H	UPPCo	11	4,025	10,500	2.6	3
South Branch								
10 Fulton's Pond Dam Tributary to Paulding Creek		R	Private	5	12			3
11 Kitchin Dam Tributary to South Branch Ontonagon River	1973	R	Private	7	14	58	4.1	3
12 Kostlenick Dam Tributary to South Branch Ontonagon River		R	Private	7	1			3
13 Paulding Pond Dam Paulding Creek	1958	R	USFS	6	7	20	2.9	3
14 Robbins Pond Dam Tributary to Sucker Creek	1955	R	USFS	4	6			3
West Branch								
15 Bergland Dam West Branch Ontonagon River	1906	H	UPPCo	8	14,080	276,000	19.6	3
16 Trout Brook Dam* Trout Brook		R	Private	8				3
17 Victoria Dam West Branch Ontonagon River	1930	H	UPPCo	115	250	10,300	41.2	1

* Dam built during the early 1960s, but exact date of construction is unknown

Table 12.–Waterfalls in the Ontonagon River watershed. Waterfall identification numbers are referenced in Figure 41.

Subwatershed, number, name	Stream	Potamodromous fish passage
Middle Branch—upper		
1 Mex-i-min-e Falls	Middle Branch Ontonagon River	NA
2 Little Falls	Middle Branch Ontonagon River	NA
3 Bond Falls	Middle Branch Ontonagon River	NA
Middle Branch—lower		
4 Agate Falls	Middle Branch Ontonagon River	No
5 Three Rapids Falls	Middle Branch Ontonagon River	Yes
6 O Kun de Kun Falls	Baltimore River	No
Main Stem		
7 Irish Rapids Falls	Ontonagon River	Yes
8 Grand Rapids Falls	Ontonagon River	Yes
East Branch		
9 Duppy Falls	Jumbo River	Yes
10 Jumbo Falls	Jumbo River	Yes
11 Onion Falls	Onion Creek	No
Cisco Branch		
12 Kakabika Falls	Cisco Branch Ontonagon River	NA
13 Wolverine Falls	Cisco Branch Ontonagon River	NA
South Branch		
14 Ajibikoka Falls	Sucker Creek	NA
15 Rock Bluff Falls	Bluff Creek	NA
16 Eighteen Mile Rapids Falls	South Branch Ontonagon River	NA
17 Flannigan Rapids Falls	South Branch Ontonagon River	NA
West Branch		
18 Marshall Falls	Marshall Creek	NA
19 Nelson Canyon Falls	Nelson Creek	NA
20 Judson Falls	Slate River	NA
21 Cascade Falls	Cascade Creek	NA
22 Gleason Creek Falls	Gleason Creek	NA
23 Sandstone Rapids Falls	Schaat Creek	NA
24 Victoria Falls	West Branch Ontonagon River	No

Table 13.–National Pollution Discharge Elimination System permits issued (as of 2006) in the Ontonagon River watershed by the Michigan Department of Environmental Quality, Water Bureau. (WWSL = waste water sewage lagoon, MDOT = Michigan Department of Transportation, OCRC = Ontonagon County Road Commission).

Facility	Watercourse	City
Middle Branch—upper		
Pitlik & Wick, Inc.*	Middle Branch Ontonagon River	Watersmeet
Watersmeet Township WWSL	Middle Branch Ontonagon River	Watersmeet
Middle Branch—lower		
Interior Township WWSL	Trout Creek	Trout Creek
Stannard Township WWSL	Tributary to Baltimore River	Bruce Crossing
Main Stem		
MDOT M-64 Relocation	Ontonagon River	Ontonagon
OCRC Rockland Road Garage	Ontonagon River	Ontonagon
Ontonagon WWSL	Ontonagon River	Ontonagon
Rockland Township WWSL	Ontonagon River	Rockland
Stone Container	Ontonagon River	Ontonagon
East Branch		
Greenland Township WWSL	Adventure Creek	Mass City
South Branch		
McMillan Township WWSL	South Branch Ontonagon River	Ewen

* Also has industrial storm water permit

Table 14.–Valley segments of the Ontonagon River watershed classified by stream temperature and catchment area, with number of segments and percent of total stream length (Baker 2006). Mean stream temperature during the first three weeks of July: cold = <66°F, cool = 66–72°F, and warm = >72° F; catchment area at the midpoint of the segment: small (headwater) = 10–40 mi^2, medium = 40–179 mi^2, large = 180–620 mi^2, and very large = >620 mi^2.

Valley segment type	Number of segments	% of total stream length
Cold small	23	25.9
Cold medium	3	4.4
Cold large	1	4.3
Cool small	20	28.5
Cool medium	4	7.8
Cool large	4	13.6
Cool very large	4	5.8
Warm medium	3	8.1
Warm large	1	1.5
Impounded	2	0.1

Table 15.–Public campgrounds in the Ontonagon River watershed. (USFS = United States Forest Service; MDNR—PRD = Michigan Department of Natural Resources, Parks and Recreation Division).

Subwatershed	Site name	Adjacent lakes or streams	Administrating agency
Middle Branch—upper	Burned Dam Campground	Middle Branch Ontonagon River	USFS
	Imp Lake Campground	Imp Lake	USFS
	Marion Lake Campground	Marion Lake	USFS
	Sylvania Campground	Clark Lake	USFS
Middle Branch—lower	Bruce Crossing Park	None	Stannard Township
East Branch	Bob Lake Campground	Bob Lake	USFS
	Sparrow Rapids Campground	East Branch Ontonagon River	USFS
Cisco Branch	Langford Lake Campground	Langford Lake	USFS
South Branch	Robbins Pond Campground	Robbins Pond	USFS
West Branch	Bergland Township Park	Lake Gogebic	Bergland Township
	Lake Gogebic County Park	Lake Gogebic	Gogebic County
	Ontonagon County Park	Lake Gogebic	Ontonagon County
	Lake Gogebic State Park	Lake Gogebic	MDNR—PRD

Table 16.–Statutes that protect aquatic resources and are administered by the Michigan Department of Environmental Quality, Water Bureau. (PA = Public Act, NRP = Natural Resources and Environmental Protection Act of 1994 [PA 451]).

State of Michigan Acts	Description of Acts
Public Health Code (1978 PA 386, as amended)	Aquatic nuisance control: regulates the application of substances to control swimmer's itch and aquatic vegetation
Part 13 NRP Act	Floodplain regulatory authority: regulates activities that occupy, fill, or grade lands within floodplains or rivers
Part 31 NRP Act	Water resource protection: regulates discharges to surface waters according to set water quality standards
Part 41 NRP Act	Sewerage systems: regulates wastewater or sewer treatment facilities
Part 91 NRP Act	Soil erosion and sedimentation control: regulates any earth change that disturbs one or more acres or is located within 500 ft of a lake or stream
Part 301 NRP Act	Inland lakes and streams: regulates structure placement or removal, dredge or fill activities below the ordinary high water mark, and operation or construction of marinas on lakes or streams
Part 303 NRP Act	Wetland protection: regulates dredging, filling, and structure placement within wetlands
Part 307 NRP Act	Inland lake level: regulates the establishment of legal lake levels and lake level control structures
Part 309 NRP Act	Inland improvement: regulates the establishment of lake boards and revolving funds to protect and improve lakes
Part 315 NRP Act	Dam safety: establishes a program to maintain a statewide inventory of dams, and provides staff to inspect dams to evaluate the integrity of the structures
Part 323 NRP Act	Shoreline protection and management: regulates construction activities within designated Great Lakes shoreline areas
Part 325 NRP Act	Great Lakes submerged lands: regulates certain activities on Great Lakes bottomlands, such as marina construction, dredging, filling, and placement of shore protection structures
Part 341 NRP Act	Irrigation: regulates the use of Great Lakes water for irrigation

Table 17.–Fishes in the Ontonagon River watershed. Data from University of Michigan Museum of Zoology and MDNR – Fisheries Division survey reports. Species origin: N = native, C = colonized, I = introduced, U = unknown. Current status: P = recent observation, R = extirpated and reintroduced, and U = status unknown. Asterisk (*) = Identification questionable.

Common name	Scientific name	Species origin	Current status
lampreys	Petromyzontidae		
northern brook lamprey	*Ichthyomyzon fossor*	N	P
silver lamprey	*Ichthyomyzon unicuspis*	N	P
sea lamprey	*Petromyzon marinus*	C	P
sturgeons	Acipenseridae		
lake sturgeon	*Acipenser fulvescens*	N	R
herrings	Clupeidae		
alewife	*Alosa pseudoharengus*	C	P
minnows	Cyprinidae		
lake chub	*Couesius plumbeus*	N	P
spotfin shiner*	*Cyprinella spiloptera*	U	U
common carp	*Cyprinus carpio*	C	U
brassy minnow	*Hybognathus hankinsoni*	N	P
common shiner	*Luxilus cornutus*	N	P
northern pearl dace	*Margariscus nachtriebi*	N	P
hornyhead chub	*Nocomis biguttatus*	N	P
golden shiner	*Notemigonus crysoleucas*	N	P
emerald shiner	*Notropis atherinoides*	N	P
bigmouth shiner	*Notropis dorsalis*	N	P
blackchin shiner	*Notropis heterodon*	N	P
blacknose shiner	*Notropis heterolepis*	N	P
spottail shiner	*Notropis hudsonius*	N	P
sand shiner	*Notropis stramineus*	N	P
mimic shiner	*Notropis volucellus*	N	P
northern redbelly dace	*Phoxinus eos*	N	P
finescale dace	*Phoxinus neogaeus*	N	P
bluntnose minnow	*Pimephales notatus*	N	P
fathead minnow	*Pimephales promelas*	N	P
longnose dace	*Rhinichthys cataractae*	N	P
western blacknose dace	*Rhinichthys obtusus*	N	P
creek chub	*Semotilus atromaculatus*	N	P
suckers	Catostomidae		
longnose sucker	*Catostomus catostomus*	N	P
white sucker	*Catostomus commersonii*	N	P
silver redhorse	*Moxostoma anisurum*	N	P
shorthead redhorse	*Moxostoma macrolepidotum*	N	P
catfishes	Ictaluridae		
black bullhead	*Ameiurus melas*	N	P
yellow bullhead	*Ameiurus natalis*	N	P
brown bullhead	*Ameiurus nebulosus*	N	P
stonecat*	*Noturus flavus*	I	U
margined madtom	*Noturus insignis*	I	U

Table 17.–Continued.

Common name	Scientific name	Species origin	Current status
pikes	Esocidae		
northern pike	*Esox lucius*	N	P
muskellunge	*Esox masquinongy*	N	P
tiger muskellunge	*Esox lucius x E. masquinongy*	N	P
mudminnows	Umbridae		
central mudminnow	*Umbra limi*	N	P
smelts	Osmeridae		
rainbow smelt	*Osmerus mordax*	I	P
trouts	Salmonidae		
lake herring	*Coregonus artedi*	N	P
lake whitefish	*Coregonus clupeaformis*	N	P
pink salmon	*Oncorhynchus gorbuscha*	C	P
coho salmon	*Oncorhynchus kisutch*	I	P
rainbow trout	*Oncorhynchus mykiss*	I	P
Chinook salmon	*Oncorhynchus tshawytscha*	I	P
round whitefish	*Prosopium cylindraceum*	N	P
Atlantic salmon	*Salmo salar*	C	P
brown trout	*Salmo trutta*	I	P
brook trout	*Salvelinus fontinalis*	N	P
lake trout	*Salvelinus namaycush*	N	P
splake	*Salvelinus fontinalis x S. namaycush*	N	P
trout-perches	Percopsidae		
trout-perch	*Percopsis omiscomaycus*	N	P
cods	Gadidae		
burbot	*Lota lota*	N	P
sticklebacks	Gasterosteidae		
brook stickleback	*Culaea inconstans*	N	P
ninespine stickleback	*Pungitius pungitius*	N	P
sculpins	Cottidae		
mottled sculpin	*Cottus bairdii*	N	P
slimy sculpin	*Cottus cognatus*	N	P
spoonhead sculpin	*Cottus ricei*	N	P
sunfishes	Centrarchidae		
rock bass	*Ambloplites rupestris*	N	P
green sunfish	*Lepomis cyanellus*	N	P
pumpkinseed	*Lepomis gibbosus*	N	P
bluegill	*Lepomis macrochirus*	N	P
northern longear sunfish*	*Lepomis peltastes*	U	U
smallmouth bass	*Micropterus dolomieu*	N	P
largemouth bass	*Micropterus salmoides*	N	P
black crappie	*Pomoxis nigromaculatus*	N	P

Table 17.–Continued.

Common name	Scientific name	Species origin	Current status
perches	Percidae		
Iowa darter	*Etheostoma exile*	N	P
johnny darter	*Etheostoma nigrum*	N	P
ruffe	*Gymnocephalus cernuus*	C	P
yellow perch	*Perca flavescens*	N	P
northern logperch	*Percina caprodes*	N	P
walleye	*Sander vitreus*	N	P

Table 18.–Mussels that could be expected to reside within the Ontonagon River watershed (SC = state listed special concern species). Data from Cummings and Mayer (1992). Asterisk (*) = Exotic species.

Common name	Scientific name
mucket	*Actinonaias carinata*
elktoe (sc)	*Alasmidonta marginata*
three-ridge	*Amblema plicata*
cylindrical papershell	*Anodontoides ferussacianus*
spike	*Elliptio dilatata*
fatmucket	*Lampsilis siliquoidea*
plain pocketbook	*Lampsilis cardium*
white heelsplitter	*Lasmigona complanta*
creek heelsplitter	*Lasmigona compressa*
fluted-shell	*Lasmigona costata*
black sandshell	*Ligumia recta*
giant floater	*Pyganodon grandis*
squawfoot	*Strophitus undulates*
Wabash pigtoe	*Fusconaia flava*
round pigtoe (sc)	*Pleurobema coccineum*
zebra mussel*	*Dreissena polymorpha*

Table 19.–Aquatic macroinvertebrates of the Middle Branch (upper and lower), East Branch, and Cisco Branch subwatersheds within the Ontonagon River basin. Phylogenetic phylum names in bold. Data code: X = present, dashes (–) = not collected, A = acceptable, and E = excellent. Data from Taft 2004, Taft 1999, and Taft 1998. (* Some stream reaches were sampled multiple times. Only the most recent macroinvertebrate ratings are recorded in this table. ** Two sites sampled in 1998. One site was rated "acceptable", and the other site was rated "poor".)

Taxa	M.B. Ontonagon (above Bond Falls)	M.B. Ontonagon (between Bond and Agate Falls)	Duck Creek	McGinty Creek	Baltimore River	E.B. Ontonagon (M-28)	E.B. Ontonagon (E.B. Rd)	Adventure Creek	Jumbo River	Spargo Creek	C.B. Ontonagon	Tenderfoot Creek	Twomile Creek
Porifera (sponges)	X	–	X	–	–	–	–	–	–	–	X	–	–
Bryozoa (moss animals)	–	–	–	–	–	–	–	X	–	–	–	–	–
Platyhelminthes (flatworms)													
Turbellaria	–	–	–	–	–	–	–	–	–	–	X	–	–
Annelida (segmented worms)													
Hirudinea (leeches)	–	–	–	–	–	–	–	–	–	–	–	–	–
Oligochaeta (worms)	–	–	–	–	–	X	–	–	–	X	X	X	X
Arthropoda													
Crustacea													
Amphipoda (scuds)	X	–	–	–	–	–	–	–	–	–	–	–	–
Decapoda (crayfish)	X	–	–	–	X	X	X	X	–	–	X	X	X
Isopoda (sowbugs)	X	–	–	–	–	–	–	X	–	–	–	–	–
Arachnoidea													
Hydracarina (mites)	X	X	X	–	X	X	X	–	–	X	X	X	X
Insecta													
Ephemeroptera (mayflies)													
Baetiscidae	X	–	–	–	–	–	–	–	–	–	–	–	–
Baetidae	X	X	X	X	X	X	X	X	X	X	X	X	X
Caenidae	X	–	–	–	X	–	–	X	–	–	–	–	–
Ephemerellidae	X	X	X	–	–	X	–	–	X	X	X	–	X
Ephemeridae	X	–	–	–	–	–	–	–	–	–	–	–	X
Heptageniidae	X	X	X	X	X	X	X	X	X	X	X	X	X
Isonychiidae	–	–	–	–	X	X	X	–	–	–	X	X	X
Leptophlebiidae	X	X	X	X	–	X	–	–	X	X	X	–	X
Tricorythidae	X	–	–	–	X	–	–	–	X	–	–	–	–
Odonata													
Anisoptera (dragonflies)													
Aeshnidae	X	–	X	X	X	–	X	–	X	X	X	–	–
Cordulegastridae	X	–	X	X	–	–	–	–	X	X	–	–	X

Table 19.–Continued.

Taxa	M.B. Ontonagon (above Bond Falls)	M.B. Ontonagon (between Bond and Agate Falls)	Duck Creek	McGinty Creek	Baltimore River	E.B. Ontonagon (M-28)	E.B. Ontonagon (E.B. Rd)	Adventure Creek	Jumbo River	Spargo Creek	C.B. Ontonagon	Tenderfoot Creek	Twomile Creek
Anisoptera (dragonflies) – continued													
Corduliidae	–	–	–	–	–	–	–	–	–	–	–	–	–
Gomphidae	X	X	X	X	X	X	X	–	–	–	X	X	X
Zygoptera (damselflies)													
Calopterygidae	X	X	–	X	X	X	–	–	–	X	X	X	X
Coenagrionidae	–	–	–	–	–	–	–	–	–	–	–	–	–
Plecoptera (stoneflies)													
Capniidae	–	–	–	–	–	–	–	–	–	–	–	–	X
Leuctridae	–	–	–	–	–	–	–	–	–	X	–	–	X
Perlidae	X	X	X	X	–	X	X	–	X	X	X	X	X
Perlodidae	X	–	X	–	–	X	–	–	–	–	–	–	–
Pteronarcyidae	X	–	–	–	–	X	X	–	–	–	–	–	X
Hemiptera (true bugs)													
Corixidae	X	–	X	–	X	–	X	X	–	–	X	–	–
Gerridae	X	X	X	–	X	X	X	X	X	X	X	X	X
Mesoveliidae	–	–	–	–	X	X	X	–	–	–	X	X	–
Saldidae	–	–	–	–	–	X	X	–	–	–	–	–	–
Veliidae	–	–	–	–	–	X	–	X	–	–	X	–	–
Megaloptera													
Corydalidae (dobson flies)	–	–	X	X	–	X	–	–	–	–	X	–	X
Sialidae (alder flies)	–	–	–	–	–	–	–	–	–	–	–	–	–
Neuroptera (spongilla flies)													
Sisyridae	–	–	–	–	–	–	–	–	–	–	X	–	–
Trichoptera (caddisflies)													
Brachycentridae	X	X	X	X	–	X	X	–	X	X	–	X	X
Glossosomatidae	X	–	X	X	X	X	–	–	X	X	X	X	X
Helicopsychidae	X	X	X	–	X	X	–	–	–	–	–	–	–
Hydropsychidae	X	–	X	X	X	X	X	X	X	–	X	X	X
Hydroptilidae	X	–	–	–	–	X	X	X	–	–	X	X	X
Lepidostomadidae	X	X	X	–	–	–	–	–	X	X	–	–	X
Leptoceridae	X	–	X	–	X	X	–	–	–	–	–	X	X
Limnephilidae	X	X	X	X	X	X	–	X	X	X	–	X	X
Molannidae	–	–	X	X	–	–	–	–	–	–	–	–	–
Philopotamidae	X	–	–	X	–	X	–	–	X	X	X	X	X

Table 19.–Continued.

Taxa	M.B. Ontonagon (above Bond Falls)	M.B. Ontonagon (between Bond and Agate Falls)	Duck Creek	McGinty Creek	Baltimore River	E.B. Ontonagon (M-28)	E.B. Ontonagon (E.B. Rd)	Adventure Creek	Jumbo River	Spargo Creek	C.B. Ontonagon	Tenderfoot Creek	Twomile Creek
Trichoptera (caddisflies) – continued													
Phryganeidae	–	–	–	–	–	–	–	X	–	–	–	–	–
Polycentropodidae	X	–	X	–	–	–	–	–	X	–	–	–	–
Psychomyiidae	X	–	–	–	–	–	X	–	–	–	–	–	–
Rhyacophilidae	–	X	–	–	–	–	–	–	–	–	–	–	–
Uenoidae	X	–	–	–	–	X	–	–	–	X	–	–	X
Coleoptera (beetles)													
Dytiscidae	X	–	–	–	–	–	–	–	–	–	–	–	–
Elmidae	X	X	X	X	X	X	X	X	X	–	X	X	X
Gyrinidae	X	–	X	–	–	–	–	–	–	–	–	–	–
Haliplidae	X	–	–	–	–	–	–	–	–	–	–	–	–
Hydrophilidae	–	–	X	–	–	X	–	X	–	–	–	–	–
Diptera (flies)													
Athericidae	X	X	X	X	X	X	X	–	X	–	X	X	X
Ceratopogonidae	X	–	X	–	–	–	–	X	X	–	X	–	X
Chaoboridae								X	–	–	–	–	–
Chironomidae	X	X	X	X	X	X	X	X	X	X	X	X	X
Dixidae	–	–	–	–	–	–	–	–	–	–	–	X	–
Empididae	–	–	–	–	–	X	–	–	–	–	–	–	–
Ptychopteridae	–	–	–	–	–	–	–	–	–	–	–	–	–
Simuliidae	X	X	–	X	X	X	X	X	X	X	X	X	X
Tabanidae	X	–	X	–	X	X	–	–	–	–	X	–	X
Tipulidae	X	X	X	–	X	X	X	X	X	X	X	–	X
Mollusca													
Gastropoda (snails)													
Ancylidae (limpets)	X	–	X	–	X	X	X	–	X	–	X	X	–
Hydrobiidae	X	–	–	–	–	–	–	–	–	–	–	–	–
Physidae	X	X	X	X	X	X	–	–	X	–	X	–	X
Planorbidae	–	–	–	–	–	X	–	–	–	–	–	–	–
Valvatidae	X	–	–	–	–	–	–	–	–	–	–	–	–
Viviparidae	–	–	–	–	–	–	–	–	–	–	–	–	–
Pelecypoda (bivalves)													
Sphaeriidae (fingernail clams)	X	–	–	X	X	–	–	X	–	–	X	–	X
Unionidae (mussels)	–	–	–	–	–	–	–	X	–	–	–	–	–
Macroinvertebrate rating*	A	A	A	A	A	A	A	**	A	E	A	A	E

Table 20.–Aquatic macroinvertebrates of the Cisco Branch, South Branch, and West Branch subwatersheds within the Ontonagon River basin. Phylogenetic phylum names in bold. Data code: X = present, dashes (–) = not collected, A = acceptable, and E = excellent. Data from Taft 2004, Taft 1999, and Taft 1995. (* Some stream reaches were sampled multiple times. Only the most recent macroinvertebrate ratings are recorded in this table.)

Taxa	South Branch	Bluff Creek	Sucker Creek	W.B. Ontonagon (M-28)	W.B. Ontonagon (Norwich Road)	Cascade Creek	Marshall Creek	Merriweather Creek	Pelton Creek	Slate River	Trout Brook
Porifera (sponges)	–	–	–	X	–	–	–	X	–	X	–
Bryozoa (moss animals)	–	–	–	X	–	–	–	–	–	–	–
Platyhelminthes (flatworms)											
Turbellaria	–	X	–	–	–	–	–	X	–	–	–
Annelida (segmented worms)											
Hirudinea (leeches)	–	–	–	–	–	X	–	–	–	–	–
Oligochaeta (worms)	–	–	X	–	–	–	–	–	X	–	–
Arthropoda											
Crustacea											
Amphipoda (scuds)	–	X	–	–	–	–	–	X	–	–	–
Decapoda (crayfish)	X	X	X	X	X	–	–	X	–	X	X
Isopoda (sowbugs)	–	–	–	–	–	–	–	–	–	–	–
Arachnoidea											
Hydracarina (mites)	–	X	X	–	–	–	X	X	–	X	–
Insecta											
Ephemeroptera (mayflies)											
Baetiscidae	–	–	X	–	–	–	–	–	–	–	–
Baetidae	X	X	X	X	X	–	X	X	X	X	X
Caenidae	X	X	–	–	X	–	–	–	–	–	–
Ephemerellidae	–	X	–	X	–	–	X	X	–	X	X
Ephemeridae	–	–	–	–	X	–	–	–	–	–	–
Heptageniidae	X	X	X	X	X	X	X	X	X	X	X
Isonychiidae	–	X	–	–	–	–	–	–	–	–	–
Leptophlebiidae	–	X	–	–	–	–	X	–	X	–	X
Tricorythidae	–	–	–	–	–	–	–	–	–	–	–
Odonata											
Anisoptera (dragonflies)											
Aeshnidae	–	X	X	–	X	X	X	–	X	X	–
Cordulegastridae	–	–	–	–	–	X	X	–	X	X	X
Corduliidae	–	–	–	–	X	–	–	–	–	–	–
Gomphidae	X	X	X	–	X	X	–	–	–	X	–

Table 20.–Continued.

Taxa	South Branch	Bluff Creek	Sucker Creek	W.B. Ontonagon (M-28)	W.B. Ontonagon (Norwich Road)	Cascade Creek	Marshall Creek	Merriweather Creek	Pelton Creek	Slate River	Trout Brook
Zygoptera (damselflies)											
Calopterygidae	–	X	X	X	X	X	–	X	–	X	–
Coenagrionidae	–	–	–	–	X	–	–	–	–	–	–
Plecoptera (stoneflies)											
Capniidae	–	–	–	–	–	–	–	–	–	–	–
Leuctridae	–	–	–	–	–	–	–	–	–	–	–
Perlidae	X	X	X	X	X	X	X	–	–	X	X
Perlodidae	–	X	–	–	–	–	–	–	–	–	–
Pteronarcyidae	X	X	X	–	–	–	–	–	–	–	–
Hemiptera (true bugs)											
Corixidae	X	X	X	–	X	–	–	–	–	X	X
Gerridae	X	X	X	X	X	X	X	X	X	X	X
Mesoveliidae	–	–	–	X	–	–	–	–	–	–	–
Saldidae	–	–	–	–	–	–	–	–	X	–	–
Veliidae	–	–	–	–	X	–	–	X	–	X	–
Megaloptera											
Corydalidae (dobson flies)	–	X	X	X	–	X	–	–	–	X	X
Sialidae (alder flies)	–	–	X	–	X	X	–	–	–	X	–
Neuroptera (spongilla flies)											
Sisyridae	–	–	–	–	–	–	–	–	–	–	–
Trichoptera (caddisflies)											
Brachycentridae	X	X	–	–	–	–	–	–	X	–	–
Glossosomatidae	–	X	–	–	–	–	X	–	–	X	X
Helicopsychidae	–	X	–	X	–	–	–	–	–	–	–
Hydropsychidae	X	X	X	X	–	X	X	X	X	X	X
Hydroptilidae	–	X	X	X	–	–	–	X	–	–	–
Lepidostomadidae	–	–	–	–	–	–	X	–	–	X	X
Leptoceridae	X	X	–	–	–	–	X	–	–	X	–
Limnephilidae	X	X	–	X	–	X	X	X	X	X	X
Molannidae	–	–	–	–	–	–	–	–	X	–	X
Philopotamidae	X	X	–	X	–	X	X	X	–	X	X
Phryganeidae	–	–	–	–	X	–	–	–	–	–	–
Polycentropodidae	–	–	–	X	X	–	–	–	–	–	–
Psychomyiidae	–	X	–	–	–	–	–	–	–	–	–
Rhyacophilidae	–	–	–	X	X	–	X	–	–	X	X
Uenoidae	–	X	–	–	–	–	–	–	X	–	–

Table 20.–Continued.

Taxa	South Branch	Bluff Creek	Sucker Creek	W.B. Ontonagon (M-28)	W.B. Ontonagon (Norwich Road)	Cascade Creek	Marshall Creek	Merriweather Creek	Pelton Creek	Slate River	Trout Brook
Coleoptera (beetles)											
Dytiscidae	–	X	–	–	–	–	–	–	–	–	–
Elmidae	X	X	X	X	X	X	X	X	–	–	X
Gyrinidae	–	–	–	–	–	–	–	–	–	–	–
Haliplidae	X	X	–	–	–	–	–	–	–	X	–
Hydrophilidae	–	–	–	–	–	X	–	–	–	X	–
Diptera (flies)											
Athericidae	–	X	X	X	–	X	X	–	X	X	–
Ceratopogonidae	X	–	X	–	–	X	X	–	–	X	X
Chaoboridae	–	–	–	–	–	–	–	–	–	–	–
Chironomidae	X	X	X	X	X	X	X	X	X	X	X
Dixidae	–	–	–	–	–	–	–	–	–	–	–
Empididae	–	X	–	–	–	–	–	–	–	–	–
Ptychopteridae	–	–	–	–	–	X	–	–	–	–	–
Simuliidae	X	X	X	–	–	–	X	X	X	X	X
Tabanidae	–	X	X	–	X	–	–	–	–	X	–
Tipulidae	–	X	X	–	–	X	X	X	X	X	–
Mollusca											
Gastropoda (snails)											
Ancylidae (limpets)	–	–	X	X	–	–	–	–	–	X	–
Hydrobiidae	–	–	–	–	–	–	–	–	–	–	–
Physidae	X	–	–	–	X	–	X	–	X	X	–
Planorbidae	–	–	–	–	–	–	–	–	–	–	–
Valvatidae	–	–	–	–	–	–	–	–	–	–	–
Viviparidae	–	–	–	–	X	–	–	–	–	–	–
Pelecypoda (bivalves)											
Sphaeriidae (fingernail clams)	–	X	X	X	X	X	–	X	X	X	–
Unionidae (mussels)	–	–	–	–	–	–	–	–	–	–	–
Macroinvertebrate rating*	A	E	A	A	A	E	E	A	A	A	E

Table 21.–Amphibians and reptiles of the Ontonagon River watershed. Data from Harding and Holman (1990), Harding and Holman (1992), Holman et al. (1999), Doepker et al. (2001), and Anonymous (2006a). Status codes: SC = state-listed special concern.

Common name	Scientific name
frogs and toads	
eastern American toad	*Bufo americanus americanus*
northern spring peeper	*Pseudacris crucifer*
eastern gray tree frog	*Hyla versicolor*
green frog	*Rana clamitans*
bullfrog	*Rana catesbeiana*
northern leopard frog	*Rana pipiens*
pickerel frog	*Rana palustris*
mink frog	*Rana septentrionalis*
wood frog	*Rana sylvatica*
salamanders	
blue-spotted salamander	*Ambystoma laterale*
spotted salamander	*Ambystoma maculatum*
eastern newt – central subspecies	*Notophthalmus viridescens*
red-backed salamander	*Plethodon cinereus*
four-toed salamander	*Hemidactylium scutatum*
mudpuppy	*Necturus maculosus*
snakes	
northern red-bellied snake	*Storeria occipitomaculata occipitomaculata*
eastern garter snake	*Thamnophis sirtalis sirtalis*
northern ring-necked snake	*Diadophis punctatus edwardsi*
smooth green snake	*Liochlorophis vernalis*
western fox snake	*Elaphe vulpina*
turtles	
snapping turtle	*Chelydra serpentina*
wood turtle (sc)	*Clemmys insculpta*
eastern box turtle (sc)	*Terrapene carolina carolina*
Blanding's turtle (sc)	*Emydoidea blandingii*
common map turtle	*Graptemys geographica*
painted turtle	*Chrysemys picta*

Table 22.–Bird species of the Ontonagon River watershed. Data from Doepker et al. (2001). State status codes: SC = special concern, T = threatened, and E = endangered.

Common name	Scientific name
Common Loon (T)	*Gavia immer*
Pied-billed Grebe	*Podilymbus podiceps*
Double-crested Cormorant	*Phalacrocorax auritus*
American Bittern (SC)	*Botaurus lentiginosus*
Least Bittern (T)	*Ixobrychus exilis*
Great Blue Heron	*Ardea herodias*
Green Heron	*Butorides virescens*
Canada Goose	*Branta Canadensis*
Wood Duck	*Aix sponsa*
Green-winged Teal	*Anas crecca*
American Black Duck	*Anas rubripes*
Mallard	*Anas platyrhynchos*
Northern Pintail	*Anas acuta*
Blue-winged Teal	*Anas discors*
Northern Shoveler	*Anas clypeata*
Gadwall	*Anas strepera*
American Wigeon	*Anas americana*
Redhead	*Aythya americana*
Ring-necked Duck	*Aythya collaris*
Common Goldeneye	*Bucephala clangula*
Bufflehead	*Bucephala albeola*
Hooded Merganser	*Lophodytes cucullatus*
Common Merganser	*Mergus merganser*
Red-breasted Merganser	*Mergus serrator*
Turkey Vulture	*Cathartes aura*
Osprey (T)	*Pandion haliaetus*
Bald Eagle (T)	*Haliaeetus leucocephalus*
Northern Harrier (SC)	*Circus cyaneus*
Sharp-shinned Hawk	*Accipiter striatus*
Cooper's Hawk (SC)	*Accipiter cooperii*
Northern Goshawk (SC)	*Accipiter gentiles*
Red-shouldered Hawk (T)	*Buteo lineatus*
Broad-winged Hawk	*Buteo platypterus*
Red-tailed Hawk	*Buteo jamicensis*
Rough-legged Hawk	*Buteo lagopus*
American Kestrel	*Falco sparverius*
Merlin (T)	*Falco columbarius*
Peregrine Falcon (E)	*Falco peregrinus*
Spruce Grouse (SC)	*Falcipennis canadensis*
Ruffed Grouse	*Bonasa umbellus*
Sharp-tailed Grouse (SC)	*Tympanuchus phasianellus*
Wild Turkey	*Meleagris gallopavo*
Virginia Rail	*Rallus limicola*
Sora	*Porzana carolina*
American Coot	*Fulica americana*
Sandhill Crane	*Grus canadensis*

Table 22.–Continued.

Common name	Scientific name
Killdeer	*Charadrius vociferus*
Spotted Sandpiper	*Actitis macularia*
Upland Sandpiper	*Bartramia longicauda*
Common Snipe	*Gallinago gallinago*
American Woodcock	*Scolopax minor*
Ring-billed Gull	*Larus delawarensis*
Herring Gull	*Larus argentatus*
Black Tern (SC)	*Chlidonias niger*
Mourning Dove	*Zenaida macroura*
Black-billed Cuckoo	*Coccyzus erythropthalmus*
Yellow-billed Cuckoo	*Coccyzus americanus*
Great Horned Owl	*Bubo virginianus*
Barred Owl	*Strix varia*
Great Gray Owl	*Strix nebulosa*
Northern Saw-whet Owl	*Aegolius acadicus*
Common Nighthawk	*Chordeiles minor*
Whip-poor-will	*Caprimulgus vociferus*
Chimney Swift	*Chaetura pelagica*
Ruby-throated Hummingbird	*Archilochus colubris*
Belted Kingfisher	*Ceryle alcyon*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Red-bellied Woodpecker	*Melanerpes carolinus*
Yellow-bellied Sapsucker	*Sphyrapicus varius*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Black-backed Woodpecker (SC)	*Picoides arcticus*
Northern Flicker	*Colaptes auratus*
Pileated Woodpecker	*Dryocopus pileatus*
Olive-sided Flycatcher	*Contopus cooperi*
Eastern Wood-pewee	*Contopus virens*
Yellow-bellied Flycatcher	*Empidonax flaviventris*
Alder Flycatcher	*Empidonax alnorum*
Willow Flycatcher	*Empidonax traillii*
Least Flycatcher	*Empidonax minimus*
Eastern Phoebe	*Sayornis phoebe*
Great Crested Flycatcher	*Myiarchus crinitus*
Eastern Kingbird	*Tyrannus tyrannus*
Purple Martin	*Progne subis*
Tree Swallow	*Tachycineta bicolor*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Bank Swallow	*Riparia riparia*
Cliff Swallow	*Petrochelidon pyrrhonota*
Barn Swallow	*Hirundo rustica*
Gray Jay	*Perisoreus canadensis*
Blue Jay	*Cyanocita cristata*
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*
Black-capped Chickadee	*Parus atricapillus*

Table 22.–Continued.

Common name	Scientific name
Boreal Chickadee	*Parus hudsonicus*
Red-breasted Nuthatch	*Sitta canadensis*
White-breasted Nuthatch	*Sitta carolinensis*
Brown Creeper	*Certhia americana*
House Wren	*Troglodytes aedon*
Winter Wren	*Troglodytes troglodytes*
Sedge Wren	*Cistothorus platensis*
Marsh Wren (SC)	*Cistothorus palustris*
Golden-crowned Kinglet	*Regulus satrapa*
Ruby-crowned Kinglet	*Regulus calendula*
Eastern Bluebird	*Sialia sialis*
Veery	*Catharus fuscescens*
Swainson's Thrush	*Catharus ustulatus*
Hermit Thrush	*Catharus guttatus*
Wood Thrush	*Hylocichla mustelina*
American Robin	*Turdus migratorius*
Gray Catbird	*Dumetella carolinensis*
Brown Thrasher	*Toxostoma rufum*
Cedar Waxwing	*Bombycilla cedrorum*
Northern Shrike	*Larius excubitor*
Blue-headed Vireo	*Vireo solitarius*
Yellow-throated Vireo	*Vireo flavifrons*
Warbling Vireo	*Vireo gilvus*
Philadelphia Vireo	*Vireo philadelphicus*
Red-eyed Vireo	*Vireo olivaceus*
Golden-winged Warbler	*Vermivora chrysoptera*
Tennessee Warbler	*Vermivora peregrine*
Nashville Warbler	*Vermivora ruficapilla*
Northern Parula	*Parula americana*
Yellow Warbler	*Dendroica petechia*
Chestnut-sided Warbler	*Dendroica pensylvanica*
Magnolia Warbler	*Dendroica magnolia*
Cape May Warbler	*Dendroica tigrina*
Black-throated Blue Warbler	*Dendroica caerulescens*
Yellow-rumped Warbler	*Dendroica coronata*
Black-throated Green Warbler	*Dendroica virens*
Blackburnian Warbler	*Dendroica fusca*
Pine Warbler	*Dendroica pinus*
Palm Warbler	*Dendroica palmarum*
Bay-breasted Warbler	*Dendroica castanea*
Cerulean Warbler (SC)	*Dendroica cerulean*
Black-and-white Warbler	*Mniotilta varia*
American Redstart	*Setophaga ruticilla*
Ovenbird	*Seiurus aurocapillus*
Northern Waterthrush	*Seiurus noveboracensis*
Connecticut Warbler	*Oporornis agilis*
Mourning Warbler	*Oporornis philadelphia*
Common Yellowthroat	*Geothlypis trichas*

Table 22.–Continued.

Common name	Scientific name
Canada Warbler	*Wilsonia canadensis*
Northern Cardinal	*Cardinalis cardinalis*
Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Indigo Bunting	*Passerina cyanea*
Dickcissel (SC)	*Spiza americana*
Eastern Towhee	*Pipilo erythrophthalmus*
Chipping Sparrow	*Spizella passerine*
Clay-colored Sparrow	*Spizella pallida*
Field Sparrow	*Spizella pusilla*
American Tree Sparrow	*Spizella arborea*
Vesper Sparrow	*Pooecetes gramineus*
Savannah Sparrow	*Passerculus sandwichensis*
Grasshopper Sparrow (SC)	*Ammodramus savannarum*
Le Conte's Sparrow	*Ammodramus leconteii*
Song Sparrow	*Melospiza melodia*
Lincoln's Sparrow	*Melospiza lincolnii*
Swamp Sparrow	*Melospiza Georgiana*
White-throated Sparrow	*Zonotrichia albicollis*
Dark-eyed Junco	*Junco hyemalis*
Snow Bunting	*Plectrophenax nivalis*
Bobolink	*Dolichonyx oryzivorus*
Red-winged Blackbird	*Agelaius phoeniceus*
Eastern Meadowlark	*Sturnella magna*
Western Meadowlark (SC)	*Sturnella neglecta*
Yellow-headed Blackbird (SC)	*Xanthocephalus xanthocephalus*
Brewer's Blackbird	*Euphagus cyanocephalus*
Common Grackle	*Quiscalus quiscula*
Brown-headed Cowbird	*Molothrus ater*
Baltimore Oriole	*Icterus galbula*
Purple Finch	*Carpodacus purpureus*
House Finch	*Carpodacus mexicanus*
Pine Grosbeak	*Pinicola enucleator*
Red Crossbill	*Loxia curvirostra*
White-winged Crossbill	*Loxia leucoptera*
Pine Siskin	*Carduelis pinus*
American Goldfinch	*Carduelis tristis*
Common Redpoll	*Carduelis flammea*
Evening Grosbeak	*Coccothraustes vespertinus*

Table 23.–Mammals of the Ontonagon River watershed. Data from Doepker et al. (2001). State status codes: SC = special concern and T = threatened. Federal status code: LT = threatened.

Common name	Scientific name
Virginia opossum	*Didelphis virginiana*
Arctic shrew	*Sorex arcticus*
masked shrew	*Sorex cinereus*
pygmy shrew	*Sorex hoyi*
water shrew	*Sorex palustris*
northern short-tailed shrew	*Blarina brevicauda*
star-nosed mole	*Condylura cristata*
northern myotis	*Myotis septentrionalis*
little brown myotis	*Myotis lucifugus*
silver-haired bat	*Lasionycteris noctivagans*
eastern pipistrelle (SC)	*Pipistrellus subflavus*
big brown bat	*Eptesicus fuscus*
eastern red bat	*Lasiurus borealis*
hoary bat	*Lasiurus cinereus*
eastern cottontail	*Sylvilagus floridanus*
snowshoe hare	*Lepus americanus*
eastern chipmunk	*Tamias striatus*
least chipmunk	*Tamias minimus*
woodchuck	*Marmota monax*
thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
eastern gray squirrel	*Sciurus carolinensis*
eastern fox squirrel	*Sciurus niger*
red squirrel	*Tamiasciurus hudsonicus*
northern flying squirrel	*Glaucomys sabrinus*
southern flying squirrel	*Glaucomys volans*
American beaver	*Castor canadensis*
deer mouse	*Peromyscus maniculatus*
southern red-backed vole	*Clethrionomys gapperi*
meadow vole	*Microtus pennsylvanicus*
muskrat	*Ondatra zibethicus*
southern bog lemming	*Synaptomys cooperi*
meadow jumping mouse	*Zapus hudsonius*
woodland jumping mouse	*Napaeozapus insignis*
common porcupine	*Erethizon dorsatum*
coyote	*Canis latrans*
gray wolf (T, LT)	*Canis lupus*
red fox	*Vulpes vulpes*

Table 23.–Continued.

Common name	Scientific name
common gray fox	*Urocyon cinereoargenteus*
black bear	*Ursus americanus*
common raccoon	*Procyon lotor*
American marten	*Martes Americana*
fisher	*Martes pennanti*
ermine	*Mustela erminea*
long-tailed weasel	*Mustela frenata*
least weasel	*Mustela nivalis*
mink	*Mustela vison*
American badger	*Taxidea taxus*
striped skunk	*Mephitis mephitis*
northern river otter	*Lutra Canadensis*
bobcat	*Lynx rufus*
white-tailed deer	*Odocoileus virginianus*
moose (SC)	*Alces alces*

Table 24.–Endangered, threatened, or otherwise significant plant and animal species, plant communities, and other natural features of the Ontonagon River watershed. Data from Anonymous (2006a) and MDNR, Fisheries Division records. State status codes: SC = special concern, T = threatened, E = endangered, S2 = imperiled, S3 = rare, S4 = apparently secure. Global rank codes: G3 = rare, G4 = apparently secure, G5 = demonstrably secure.

Common name	Scientific name	Global rank	State status
vertebrates			
lake sturgeon	*Acipenser fulvescens*	G3	T
lake herring	*Coregonus artedi*	G5	T
wood turtle	*Glyptemys insculpta*	G4	SC
eastern box turtle	*Terrapene carolina carolina*	G5	SC
Blanding's turtle	*Emydoidea blandingii*	G4	SC
Common Loon	*Gavia immer*	G5	T
American Bittern	*Botaurus lentiginosus*	G4	SC
Least Bittern	*Ixobrychus exilis*	G5	T
Osprey	*Pandion haliaetus*	G5	T
Bald Eagle	*Haliaeetus leucocephalus*	G4	T
Northern Harrier	*Circus cyaneus*	G5	SC
Cooper's Hawk	*Accipiter cooperii*	G5	SC
Northern Goshawk	*Accipiter gentiles*	G5	SC
Red-shouldered Hawk	*Buteo lineatus*	G5	T
Merlin	*Falco columbarius*	G5	T
Peregrine Falcon	*Falco peregrinus*	G4	E
Spruce Grouse	*Falcipennis canadensis*	G5	SC
Sharp-tailed Grouse	*Tympanuchus phasianellus*	G4	SC
Black Tern	*Chlidonias niger*	G4	SC
Black-backed Woodpecker	*Picoides arcticus*	G5	SC
Marsh Wren	*Cistothorus palustris*	G5	SC
Cerulean Warbler	*Dendroica cerulean*	G4	SC
Dickcissel	*Spiza americana*	G5	SC
Grasshopper Sparrow	*Ammodramus savannarum*	G5	SC
Western Meadowlark	*Sturnella neglecta*	G5	SC
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	G5	SC
eastern pipistrelle	*Pipistrellus subflavus*	G5	SC
gray wolf	*Canis lupus*	G4	T
moose	*Alces alces*	G5	SC
invertebrates			
rapids clubtail	*Gomphus quadricolor*	G3	SC
delicate vertigo	*Vertigo bollesiana*	G3	SC
land snail	*Vertigo paradoxa*	G3	SC
fungi			
anzia lichen	*Anzia colpodes*		
treeflute	*Menegazzia terebrata*		
plants			
flat oat grass	*Danthonia compressa*	G5	SC
American shore-grass	*Littorella uniflora*	G5	SC
Canadian milk-vetch	*Astragalus canadensis*	G5	T
Cooper's milk-vetch	*Astragalus neglectus*	G4	SC
assiniboia sedge	*Carex assiniboinensis*	G4	T

Table 24.–Continued.

Common name	Scientific name	Global rank	State status
plants – continued			
calypso or fairy-slipper	*Calypso bulbosa*	G5	T
fragrant cliff woodfern	*Dryopteris fragrans*	G5	SC
male fern	*Drypoteris filix-mas*	G5	SC
goblin moonwort	*Botrychium mormo*	G3	T
purple clematis	*Clematis occidentalis*	G5	SC
veiny meadow-rue	*Thalictrum venulosum var. confine*	G4	SC
sweet coltsfoot	*Petasites sagittatus*	G5	T
hedge-hyssop	*Gratiola aurea*	G5	T
downy sunflower	*Helianthus mollis*	G4	T
fir clubmoss	*Huperzia selago*	G5	SC
swamp candles	*Lysimachia hybrida*	G5	SC
ginseng	*Panax quinquefolius*	G3	T
showy orchis	*Galearis spectabilis*	G5	T
western monkey-flower	*Mimulus guttatus*	G5	SC
small blue-eyed Mary	*Collinsia parviflora*	G5	T
fairy bells	*Disporum hookeri*	G5	E
prairie buttercup	*Ranunculus rhomboideus*	G5	T
pine-drops	*Pterospora andromedea*	G5	T
small yellow pond-lily	*Nuphar pumila*	G5	E
ram's head lady's-slipper	*Cypripedium arietinum*	G3	SC
farwell's water-milfoil	*Myriophyllum farwellii*	G5	T
big-leaf sandwort	*Arenaria macrophylla*	G4	T
northern reedgrass	*Calamagrostris lacustris*	G3	T
plant communities			
bedrock glade		G3	S2
dry-mesic northern forest		G4	S3
dry non-acid cliff		G4	S2
moist non-acid cliff		G4	S2
mesic northern forest		G4	S3
poor conifer swamp		G4	S4
other features			
great blue heron rookery			
extrusive igneous feature			
meander			

Table 25.–Fish stocking for streams within the Ontonagon River watershed, 1982–2005 (MDNR 2006). Life stage codes: AD = adult, FF = fall fingerling, SF = spring fingerling, and YR = yearling.

Subwatershed and location	Species	Life stage	Years	Total number
Middle Branch—upper				
Middle Branch (above Bond Falls)	brook trout	YR	85–86, 90–00	100,418
Middle Branch (between Bond and Agate Falls	brook trout	YR	85–88, 90–97, 05	60,600
	brown trout	YR	85–97	33,108
	rainbow trout[a]	YR	93	300
Tamarack River	brook trout[a]	YR	97	250
	brook trout[b]	YR	04–05	4,000
Main Stem				
Ontonagon River	brown trout	YR	89	14,060
	Chinook salmon	SF	87–93	516,132
	lake sturgeon	FF	98–02, 04	31,999
	lake sturgeon	YR	01	12
	lake trout	YR	82–83	50,000
	lake trout[c]	YR	84, 86, 88–89, 91, 94	398,650
	rainbow trout	FF	89, 92, 94, 96	748,581
	rainbow trout	SF	88	81,000
	rainbow trout	YR	88–02	448,553
	walleye	FF	93, 01	46,143
	walleye	SF	89–91, 01, 04	165,826
	yellow perch	AD	97	6,630
East Branch				
East Branch	rainbow trout	YR	05	31,000
E. Br. Jumbo River	brook trout[b]	SF	00	19,654
Jumbo River	rainbow trout	YR	03–04	69,500
Shane Creek	brook trout[b]	SF	00	4,010
	brook trout[b]	YR	00	1,639
Slave Creek	brook trout[b]	SF	00	2,476
Smith Creek	brook trout[b]	YR	04–05	3,000
State Creek	brook trout[b]	SF	00	1,717
	brook trout[b]	YR	00	736
Cisco Branch				
Twomile Creek	brook trout[b]	YR	05	2,000

[a] Private plant
[b] Keweenaw Bay Indian Community plant
[c] Federal plant

Table 26.–Fish stocking for lakes within the Ontonagon River watershed, 1935–2005. Data from MDNR (2006) and MDNR – Baraga Office files. Life stage codes: AD = adult, FF = fall fingerling, FG = fingerling (season not specified), SF = spring fingerling, and YR = yearling. Asterisk (*) = private plant and double asterisks (**) = fish planted by Wisconsin Department of Natural Resources.

Subwatershed and location	Species	Life stage	Years	Total number
Middle Branch—upper				
Albino Lake	largemouth bass	FF	42	100
	northern pike	AD	54–55, 64	132
	smallmouth bass	FF	40, 42	1,200
Allen Lake	bluegill	FF	35–40, 42	32,000
	largemouth bass	FF	37–38	500
	largemouth bass	SF	38–39	700
	smallmouth bass	FF	36	200
	smallmouth bass	SF	39	1,100
	walleye	SF	83, 89–90, 98, 00, 03	20,380
Anderson Lake	bluegill	FF	35–38	17,000
	largemouth bass	FF	37–38	600
	largemouth bass	SF	38	300
	smallmouth bass	FF	36	200
Bass Lake	bluegill	FF	35–40	84,000
	largemouth bass	SF	35, 38	700
	muskellunge	SF	63, 71–72, 76, 80	5,910
	muskellunge	Fry	76	150,000
	smallmouth bass	FF	36–37	900
	smallmouth bass	SF	35, 38, 40	1,700
	yellow perch	FF	35	1,000
Beaver Dam Lake	bluegill	FF	35–39	15,000
	largemouth bass	FF	37	300
	largemouth bass	SF	38	100
	smallmouth bass	FF	36	100
Beaver Station Lake	bluegill	FF	35–39	16,000
	largemouth bass	FF	37	300
	largemouth bass	SF	38	200
	smallmouth bass	FF	36	200
	walleye*	unknown	80	2,000
Bond Falls Flowage	walleye	SF	87, 89–91, 93, 98, 00–01	119,704
	yellow perch	AD	84, 88, 91, 95	63,004
	yellow perch	SF	90	4,376
Buck Lake	bluegill	SF	42	5,000
	brook trout	YR	61	5,000
	largemouth bass	SF	42–43	300
	smallmouth bass	SF	42–44	1,500
Castle Lake	brook trout	AD	62	250
	brook trout	FF	63, 76–77, 82–86, 03–05	24,520
	brook trout	SF	64, 66–70, 74–75, 79–81	28,700

Table 26.–Continued.

Subwatershed and location	Species	Life stage	Years	Total number
Middle Branch—upper – continued				
Castle Lake	brook trout	YR	72–73, 78, 87–02	38,406
Clear Lake	bluegill	FF	35, 37–40	23,000
	smallmouth bass	SF	35	200
Crooked Lake	bluegill	FF	35–41	113,000
	brook trout	YR	61	5,000
	largemouth bass	FF	36, 38	2,000
	rainbow trout	AD	44, 51, 53–61, 63–64	24,000
	rainbow trout	FF	66	10,000
	rainbow trout	YR	52	2,000
	smallmouth bass	FF	36–38	6,600
	smallmouth bass	SF	35, 38–40	6,600
	yellow perch	FF	35	12,500
Devils Head Lake	bluegill	FF	42	2,500
	bluegill	AD	67	273
	brook trout	AD	63	750
	brook trout	FF	64	1,000
	largemouth bass	FF	65	2,000
Devils Head Lake	rainbow trout	FF	63–64	6,000
Dinner Lake	bluegill	FF	35–40, 42	33,500
	largemouth bass	FF	38, 42–43, 45	1,500
	largemouth bass	SF	39	500
	smallmouth bass	FF	36–37, 41–43	2,300
	smallmouth bass	SF	38–40	3,700
	walleye	FF	97	1,115
	walleye	SF	83, 85–86, 89, 92, 98, 00, 04	39,217
Doyle Lake	bluegill	FF	39	11,000
	brook trout*	AD	57	500
Duck Lake	bluegill	FF	35–39	83,000
	bluegill	YR	45	500
	brook trout	YR	61	7,000
	brown trout	YR	92	400
	largemouth bass	FF	36–38, 45	3,100
	smallmouth bass	FF	36–37	1,500
	walleye	FF	93	2,500
	walleye	SF	90–91, 93, 95, 98, 00, 02, 04	170,983
	yellow perch	FF	35	12,000
Hilltop Lake	bluegill	YR	40	150
	brook trout	AD	43, 53, 93	1,700
	brook trout	FF	41, 50–52, 54–64, 80, 82–86	57,151
	brook trout	SF	81	2,700
Hilltop Lake	brook trout	YR	42, 87–88, 90–96	13,300
	brown trout	AD	47	8,000
	brown trout	FF	48	8,000

Table 26.–Continued.

Subwatershed and location	Species	Life stage	Years	Total number
Middle Branch—upper – continued				
Hilltop Lake – continued	largemouth bass	YR	40	25
	largemouth bass	SF	35	500
	rainbow trout	FF	40	2,000
	rainbow trout	FF	59–61, 63–64	10,000
	rainbow trout	YR	42	700
	smallmouth bass	SF	35	400
	splake	FF	66–67	8,000
Hoist Lake	bluegill	unknown	42	5,000
	bluegill	FF	35–39	21,000
	largemouth bass	FF	37, 42–43	1,100
	largemouth bass	SF	38–39	1,200
	smallmouth bass	FF	36, 42–43	500
	smallmouth bass	SF	35	200
Horseshoe Lake	bluegill	FF	35, 37	12,500
	largemouth bass	SF	35, 38–39	800
	smallmouth bass	FF	36	200
Imp Lake	bluegill	FF	35–40	31,000
	brook trout	FF	58	5,000
	brook trout	YR	61, 90	7,250
	brown trout	YR	89	2,500
	lake trout	FF	36	2,000
	lake trout	SF	38, 40	28,000
	lake trout	YR	61, 70–71, 79	21,210
	rainbow smelt	AD	42	668
	rainbow trout	AD	43–45, 52–55, 57, 59	11,000
	rainbow trout	FF	46, 48–51	36,700
	rainbow trout	YR	78	2,100
	smallmouth bass	FF	36–37	800
	smallmouth bass	SF	35, 38–40	2,600
	splake	FF	63–65, 67, 69, 75	49,700
	splake	SF	74	8,400
	splake	YR	61, 73, 81–82, 85, 87–88, 91–05	127,670
Jennings Lake	brook trout	AD	43	1,000
Joyce Lake	bluegill	FF	35	3,000
Lindsley Lake	tiger muskellunge	SF	79	800
Little Duck Lake	bluegill	FF	38	5,000
	brook trout	YR	89–90	4,000
	largemouth bass	FF	38	400
	largemouth bass	SF	38	200
	rainbow trout	FF	46–50, 52–56, 59–61, 63–64, 66	68,000
	rainbow trout	SF	72, 78	5,000

Table 26.–Continued.

Subwatershed and location	Species	Life stage	Years	Total number
Middle Branch—upper – continued				
Little Duck Lake – continued	rainbow trout	YR	51, 57–58, 62, 68–71, 77–85, 87–05	111,150
	splake	FF	66–71, 85	28,500
	splake	YR	72–74, 83, 85–88, 91–05	39,482
Lumberjack Lake	largemouth bass	AD	62	32
Marion Lake	bluegill	AD	92	647
	bluegill	FF	35–40	117,000
	largemouth bass	FF	37–38, 67	4,225
	largemouth bass	SF	38	500
	smallmouth bass	FF	36, 68	7,296
	smallmouth bass	SF	35, 39–40	5,500
	tiger muskellunge	SF	68, 79	2,800
	walleye	AD	61	260
	walleye	FF	91	2,409
	walleye	Fry	68–72, 91	6,900,000
	walleye	SF	90–91, 98, 00, 02, 04	59,287
	yellow perch	AD	90, 92	5,411
Perch Lake	bluegill	FF	35, 37–38	28,000
	largemouth bass	FF	37	300
	smallmouth bass	FF	36	200
	smallmouth bass	SF	40	1,000
	yellow perch	FF	35	1,000
Porcupine Lake	bluegill	FF	42	5,000
Powwow Lake	northern pike	AD	62	150
Schneider Lake	largemouth bass	AD	62	32
	largemouth bass	YR	62	32
Snap Jack Lake	bluegill	FF	35–38, 40	28,000
	largemouth bass	YR	40	200
	smallmouth bass	FF	36	200
	smallmouth bass	SF	35	200
	yellow perch	FF	35	1,000
Sun Lake	bluegill	FF	38, 40	19,000
Tamarack Lake	bluegill	FF	36–38	39,000
	brook trout	YR	61	6,000
	largemouth bass	FF	38	500
	largemouth bass	SF	38	400
Tamarack Lake	walleye	SF	84–86, 88–89	73,782
Taylor Lake	bluegill	FF	35–37	33,000
	brook trout	FF	64	5,000
	largemouth bass	FF	37	300
	largemouth bass	SF	35, 38	500
	smallmouth bass	FF	36	300

Table 26.–Continued.

Subwatershed and location	Species	Life stage	Years	Total number
Middle Branch—upper – continued				
Taylor Lake – continued	smallmouth bass	SF	39	500
	splake	YR	73–74	12,100
Tomassi Lake	largemouth bass	unknown	39	500
Twist Lake	bluegill	unknown	39–40	28,000
	bluegill	FF	42	5,000
	smallmouth bass	FF	68, 70	2,730
Wilson Lake	bluegill	YR	45	500
	largemouth bass	FF	45	300
Wolf Lake	bluegill	FF	35–38	36,000
	largemouth bass	FF	37	600
	largemouth bass	SF	38	200
	smallmouth bass	FF	36	200
	smallmouth bass	SF	35	200
	yellow perch	FF	35	2,000
Middle Branch—lower				
Erickson Lake	bluegill	FF	36–40, 42	30,000
	bluegill	YR	40	200
	largemouth bass	unknown	41	1,000
	largemouth bass	FF	36, 42	400
	largemouth bass	SF	38	100
	smallmouth bass	FF	37, 42, 44	1,600
	smallmouth bass	SF	39–40	1,600
Tanlund Lake	rainbow trout	FF	55–57, 59–64, 66	26,000
	rainbow trout	SF	58–59, 68–73, 79	14,500
	rainbow trout	YR	67, 74, 78, 80–83, 85–96	20,500
Trout Creek Pond	brook trout*	AD	89, 92	825
	brook trout	FF	76	500
	brook trout	SF	75	500
	brook trout	YR	74, 98–05	3,850
	brown trout	YR	77, 79–81, 03	2,900
	rainbow trout*	AD	90	400
	rainbow trout	YR	78	500
East Branch				
Bob Lake	bluegill	FF	35–40	85,500
	brook trout	FF	60, 62–64, 81–82	105,000
	brook trout	SF	70, 72, 80–81	51,000
	brook trout	YR	68, 71	37,000
	brown trout	YR	73–76	21,000
	largemouth bass	FF	36–38, 60	4,800
	largemouth bass	SF	35, 38	1,300
	rainbow trout	SF	70, 72	18,000
	rainbow trout	YR	68, 71	14,500

Table 26.–Continued.

Subwatershed and location	Species	Life stage	Years	Total number
East Branch – continued				
Bob Lake – continued	smallmouth bass	AD	97	61
	smallmouth bass	FF	36, 41	900
	smallmouth bass	SF	39–40	2,200
	walleye	FF	97	1,000
	walleye	SF	84–86, 88, 91, 93, 98–00, 02–03	42,258
	yellow perch	FF	35	5,000
Clear Lake	bluegill	FF	36–37	7,000
	brook trout	AD	44	1,000
	brook trout	YR	43	500
	largemouth bass	FF	37	400
	rainbow trout	AD	45	500
	rainbow trout	FF	47	5,700
	smallmouth bass	FF	36, 40	1,200
Crystal Lake	brown trout	YR	78–81, 83, 85, 87–96	24,195
	rainbow trout	AD	56, 58–64	13,500
	rainbow trout	FF	56, 66, 76	12,825
	rainbow trout	SF	67–68, 70	10,000
	rainbow trout	YR	56–57, 71–74, 76–77	14,665
	yellow perch	FF	35	1,000
Echo Lake	bluegill	FF	39	10,000
	bluegill	YR	40	300
	largemouth bass	FF	38	200
	largemouth bass	YR	40	350
	yellow perch	AD	54	105
Hager Lake	bluegill	FF	35	2,000
	brook trout	FF	64, 75	5,500
	brook trout	SF	66–67, 70	20,000
	brook trout	YR	73–74	7,000
	smallmouth bass	FF	35–36	400
	rainbow trout	YR	78–80	4,900
	splake	FF	69	5,000
Hager Lake	yellow perch	FF	35	1,000
Kunze Lake	bluegill	FF	35–36, 38	8,000
	largemouth bass	FF	42, 91	1,250
	rainbow trout	SF	79–80	4,000
	rainbow trout	YR	80–88	8,475
	smallmouth bass	FF	35	200
	yellow perch	FF	35	1,000
Lake On-three	brook trout	AD	60–64	3,000
	rainbow trout	AD	60, 63–64	2,000
	rainbow trout	FF	61–62, 71	6,500
	rainbow trout	SF	66, 68–70, 72, 79	31,250

Table 26.–Continued.

Subwatershed and location	Species	Life stage	Years	Total number
East Branch – continued				
Lake On-three – continued	rainbow trout	YR	67, 73–74, 77–78, 80–82, 84–05	41,380
Lake Thirteen	bluegill	AD	71, 79	410
	bluegill	FF	35–39	30,000
	brook trout	FF	40	5,000
	brook trout	SF	43	2,000
	largemouth bass	FF	70	12,000
	largemouth bass	SF	38–39, 71	19,100
	largemouth bass	YR	70	200
	yellow perch	FF	35	1,000
Lower Dam Lake	brook trout	AD	94	50
	brook trout	FF	64	3,000
	brook trout	SF	66–68, 70	22,000
	brook trout	YR	65	1,190
	brown trout	YR	83–89	9,775
Markey Lake	bluegill	FF	39	5,000
	largemouth bass	FF	38	200
Tepee Lake	northern pike	AD	63, 79, 92	702
	northern pike	SF	86, 89, 95	3,569
	walleye	SF	80, 83, 92–93, 95	20,362
Upper Dam Lake	brook trout	FF	40	4,000
Cisco Branch				
Beatons Lake	bluegill	FF	35–41	78,000
	lake trout	AD	74–77, 84–85	8,591
	lake trout	FF	35–36, 38, 68, 83	94,500
	lake trout	SF	38, 40–42	118,000
	lake trout	YR	70–71, 79–83	113,760
	lake whitefish	AD	69	59
	rainbow smelt	AD	75	7,200
	rainbow trout	AD	43–44, 57–61, 63–64	19,275
	rainbow trout	SF	42, 70	70,000
	rainbow trout	FF	43, 51–55, 68	186,000
	rainbow trout	YR	72–73, 78, 81–05	355,622
	smallmouth bass	FF	36–37	1,500
	smallmouth bass	SF	38–39	2,000
	splake	SF	65	5,000
	splake	FF	63–64, 68, 70–71, 75–77, 85	248,175
	splake	YR	71, 81–83, 85–88, 92–93, 99–04	139,410
	walleye	FF	95	5,429
	walleye	Fry	94, 96	4,400,000
	walleye	SF	94–95, 97–99, 01–03	175,775
	yellow perch	FF	35	4,000

Table 26.–Continued.

Subwatershed and location	Species	Life stage	Years	Total number
Cisco Branch – continued				
Big Lake	muskellunge**	unknown	37	46,000
	muskellunge**	FF	39, 73, 90–93, 99, 01	3,460
	muskellunge**	Fry	38–41	10,502,928
	muskellunge**	SF	41–42, 51, 54, 73, 88	12,398
	northern pike**	Fry	38	3,000,000
	walleye	Fry	37	750,000
	walleye**	Fry	35, 37–38, 40–43	23,789,195
	walleye**	SF	50, 53, 64, 73, 75, 77	82,383
Cisco Lake	muskellunge	SF	81	400
	tiger muskellunge	SF	79	2,000
	walleye*	FF	83–85, 87–88, 94, 96	27,749
	walleye	Fry	35–40, 42, 85–86	7,050,000
	walleye	SF	83–84, 92–93, 98–00	85,865
	walleye*	SF	85–86	17,200
	walleye*	YR	89	8,500
	yellow perch	FF	35–37	19,000
Clearwater Lake	bluegill	FF	35	5,000
Cloverleaf Lake	bluegill	FF	35	5,000
Cornelia Lake	brook trout	FF	64, 66, 76, 82–86, 03–04	13,460
	brook trout	SF	67–68, 70, 74–75, 78–81	19,100
	brook trout	YR	73, 87–02, 05	19,578
	rainbow trout	FF	64	1,500
Devils Lake	largemouth bass**	FG	45	388
Forest Lake	bluegill**	AD	38	1,600
	bluegill**	YR	36	80
	largemouth bass**	FG	37, 44, 49–50, 52	15,580
	largemouth bass**	Fry	39–40	5,800
Forest Lake	walleye**	FG	65–67, 77	98,775
	yellow perch**	AD	38	200
	yellow perch**	YR	36	320
Langford Lake	bluegill	FF	37, 39–42	45,000
	largemouth bass	FF	37–38, 41–43	2,560
	largemouth bass	SF	38	500
	smallmouth bass	FF	41–44	4,300
	smallmouth bass	SF	39	1,000
	walleye	FF	94	10,366
	walleye	Fry	91	1,100,000
	walleye	SF	90–93, 95, 00, 03	125,000
Long Lake	bluegill	FF	35–41	68,000
	fathead minnow	AD	92	116,400
	lake trout	FF	36	2,000
	northern pike	AD	73	300
	largemouth bass	FF	36–38	1,900

Table 26.–Continued.

Subwatershed and location	Species	Life stage	Years	Total number
Cisco Branch – continued				
Long Lake – continued	smallmouth bass	FF	36–37, 41	2,100
	smallmouth bass	SF	38, 40	1,400
	walleye	SF	02	10,927
	yellow perch	AD	91	350
	yellow perch	FF	35	3,000
Mamie Lake	largemouth bass**	FG	44, 46, 49–50	11,350
	muskellunge**	FG	37–41, 54, 85	11,193
	muskellunge**	Fry	36–40	212,803
	walleye**	FG	53, 72, 74, 76, 85	40,912
	walleye**	Fry	35–41	11,526,635
Morris Lake	walleye*	AD	56	300
Palmer Lake	largemouth bass**	FG	49–50, 53–53, 55, 57	15,677
	muskellunge**	FG	51, 65–66, 70, 76, 84, 86, 88, 90–93, 97, 99, 03, 05	13,058
	walleye**	FG	75, 77, 83, 85, 87, 89, 91–92, 94, 98, 00, 02, 04	387,874
Spring Lake	bluegill**	AD	38	1,240
	walleye**	FG	52–53	9,850
	walleye**	Fry	39	270,000
	yellow perch**	FG	37	24,000
Tenderfoot Lake	largemouth bass**	FG	35, 50 , 52–53	14,380
	largemouth bass**	Fry	39	1,500
	muskellunge**	Fry	37, 39 , 41–42	75,000
	smallmouth bass**	FG	42, 44	24,600
	tiger muskellunge**	Fry	37	53,500
Tenderfoot Lake	walleye**	Fry	38–42	4,219,250
Thousand Island Lake	brook trout	YR	61	25,500
	lake trout	AD	75, 79	2,103
	lake trout	FF	35–36, 38, 42	70,500
	lake trout	SF	38, 40–42	120,000
	lake trout	YR	38	8,000
	rainbow trout	AD	51	2,500
	rainbow trout	YR	50	2,500
	walleye	FF	93	24,178
	walleye*	FF	97	5,300
	walleye	Fry	35–40, 42	7,700,000
	walleye	SF	86, 91, 95, 03	54,955
	walleye*	SF	98	8,000
	yellow perch	FF	35–37	34,500
West Bay Lake	walleye	Fry	37	625,000
South Branch				
County Line Lake	bluegill	unknown	41	5,000
	bluegill	FF	36–40, 42	27,300

Table 26.–Continued.

Subwatershed and location	Species	Life stage	Years	Total number
South Branch – continued				
County Line Lake - continued	bluegill	YR	40	200
	brook trout	AD	60–64	2,500
	largemouth bass	FF	36–37, 42–43	1,000
	largemouth bass	SF	38	100
	rainbow trout	AD	60–61, 63–64	4,930
	rainbow trout	FF	76	3,200
	rainbow trout	YR	68–70, 72–74, 76–80	38,425
	smallmouth bass	FF	42–43	600
	smallmouth bass	SF	39–40	1,800
	splake	SF	67–70	19,000
Crane Lake	bluegill	FF	41	5,000
	largemouth bass	FF	41	1,000
Deadman Lake	bluegill	FF	35–40	51,000
	largemouth bass	FF	37	400
	largemouth bass	SF	38	200
	northern pike	AD	50	267
	smallmouth bass	FF	36	200
	smallmouth bass	SF	40	1,000
	smallmouth bass	YR	92	73
Steusser Lake	bluegill	FF	38–39	13,000
	brook trout	FF	48–49	5,000
Sucker Lake	bluegill	FF	35, 38	10,000
	northern pike	AD	45	44
	walleye	Fry	35, 37–39	1,050,000
West Branch				
Cup Lake	northern pike	AD	64	100
Lake Gogebic	bluegill	FF	41	15,000
	bluegill	YR	43–45	54,000
	emerald shiner	AD	88	31,250
	fathead minnow*	AD	95–97	2,652,000
	sand shiner	AD	88	31,250
	smallmouth bass	FF	37	1,000
	walleye	Fry	35–40, 74–81	27,822,000
	yellow perch	FF	35–37	23,000
Victoria Reservoir	bluegill	FF	37	10,000
	smallmouth bass	FF	37	1,200
	smallmouth bass	SF	39	2,000
	walleye	Fry	38–40, 71–72	7,155,000
	walleye	SF	00–02	69,683

Table 27.–Public boat launches in the Ontonagon River watershed (MDNR 1996; Michael Vogelsang, WDNR , personal communication). Ramp codes: 1 = hard surfaced ramp with sufficient water depth to accommodate most trailerable boats, 2 = hard surfaced ramp with limited water depth, 3 = gravel ramp, and 4 = carry-down launching area. Administrating agencies: USFS = United States Forest Service, UPPCo = Upper Peninsula Power Company, MDNR = Michigan Department of Natural Resources, WDNR = Wisconsin Department of Natural Resources, and Local = county, township, or village.

Subwatershed	Launch name	Ramp code	Courtesy pier	Toilets	Administrating agency
Middle Branch—upper	Allen Lake	2	No	Yes	USFS
	Bond Falls Flowage	3	No	No	UPPCo
	Clark Lake	3	No	Yes	USFS
	Crooked Lake	1	No	Yes	USFS
	Dinner Lake	2	No	Yes	MDNR
	Duck Lake	1	No	Yes	MDNR
	Imp Lake	1	No	Yes	USFS
	Little Duck Lake	3	No	Yes	USFS
	Marion Lake NE	1	No	Yes	USFS
	Marion Lake NW	3	No	No	USFS
	Middle Branch—Watersmeet	4	No	No	USFS
	Tamarack Lake	2	No	Yes	MDNR
	Taylor Lake	3	No	Yes	USFS
Main Stem	Ontonagon Harbor	1	Yes	Yes	Local
East Branch	Bob Lake	3	No	Yes	USFS
	Crystal Lake	4	No	No	USFS
	Hager Lake	4	No	No	USFS
	Kunze Lake	4	No	No	USFS
	Lake On-three	4	No	No	USFS
	Lower Dam Lake	4	No	Yes	USFS
	Tepee Lake	3	No	Yes	USFS
Cisco Branch	Beatons Lake #1	3	No	Yes	USFS
	Beatons Lake #2	4	No	No	USFS
	Big Lake	1	Yes	No	WDNR
	Cisco Lake	1	Yes	Yes	MDNR
	Clearwater Lake	2	No	Yes	MDNR
	Forest Lake	3	No	No	Local
	Langford Lake	2	No	Yes	USFS
	Long Lake	3	No	Yes	USFS
	Mamie Lake	1	Yes	Yes	Local
	Merrill Lake	3	No	No	Local
	Palmer Lake	1	Yes	No	Local
	Thousand Island Lake	1	Yes	Yes	MDNR
South Branch	County Line Lake	2	No	Yes	MDNR
	Deadman Lake	3	No	No	USFS
	Paulding Pond	4	No	Yes	USFS
	Robbins Pond	4	No	Yes	USFS
	South Branch—Ewen	4	No	No	MDNR
	Steusser Lake	3	No	No	USFS
West Branch	Lake Gogebic—Bergland	1	Yes	Yes	MDNR
	Lake Gogebic—East	1	Yes	Yes	MDNR
	Lake Gogebic—Gog. Park	1	Yes	Yes	Local
	Lake Gogebic—Ont. Park	1	Yes	Yes	Local
	Lake Gogebic—State Park	1	Yes	Yes	MDNR
	Victoria Reservoir	1	Yes	No	UPPCo

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APPENDICES

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Appendix A

Federal Energy Regulatory Commission settlement agreement between Upper Peninsula Power Company, Michigan Department of Natural Resources, United States Forest Service, United States Fish and Wildlife Service, Wisconsin Department of Natural Resources, Michigan Hydro Relicensing Coalition, American Rivers, American Whitewater Affiliation, Keweenaw Bay Indian Community, and Michigan Department of the Attorney General.

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Project No. 1864-005

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION
104 FERC ¶ 62,135

Upper Peninsula Power Company Project No. 1864-005

ORDER APPROVING SETTLEMENT AND ISSUING NEW LICENSE
(August 20, 2003)

INTRODUCTION

1. Upper Peninsula Power Company (UPPCO) has filed an application for a new license, pursuant to Sections 15 and 4(e) of the Federal Power Act (FPA),[1] for the continued operation and maintenance of the 12-megawatt (MW) Bond Falls Hydroelectric Project No. 1864, located on the Ontonagon River in Ontonagon and Gogebic Counties, Michigan, and Vilas County, Wisconsin, partially on lands within the Ottawa National Forest.[2] UPPCO proposes to continue operating the existing project facilities for power production and to implement certain measures to enhance environmental conditions. UPPCO proposes no new capacity-related construction.

2. UPPCO filed a Settlement Agreement (Agreement) with the Commission on July 11, 2000. The Agreement proposes measures to resolve most of the relicensing issues that pertain to the operation of the project. For the reasons discussed below, this order approves the Agreement and issues a new license to UPPCO for the Bond Falls Project No. 1864.

BACKGROUND

3. The original license for the Bond Falls Project was issued on August 7, 1953, with a term expiring on December 31, 1988.[3] Since that time UPPCO has operated the project under annual licenses.[4]

4. UPPCO filed its application for a new license on December 24, 1987. Public notice of the application was issued on September 7, 1988. Timely motions to intervene were filed by the Wisconsin Department of Natural Resources (Wisconsin DNR) and by William Kananen.[5] Late

[1] 16 U.S.C. §§ 808 and 797(e).

[2] One of the project's four developments, Bond Falls, occupies 73.5 acres of land within the Ottawa National Forest.

[3] 12 F.P.C. 1135. The license was amended in 1981 to include UPPCO's constructed Victoria Project No. 2382. See Upper Peninsula Power Company, 14 FERC ¶ 62,274 (1981).

[4] See 15 (a)(1) of the FPA. 16 U.S.C. § 808(a)(1).

[5] Mr. Kananen and Wisconsin DNR's motions were timely and unopposed, and therefore, automatically granted pursuant to Rule 214(c)(1) of the Commission's Rules of Practice and Procedure. 18 CFR 385.214(c)(1).

motions to intervene were filed by the Anglers of AuSable, Great Lakes Council, Inc., Federation of Fly Fishers, Inc., Trout Unlimited, and the Michigan United Conservation Clubs, jointly (Anglers); and by American Rivers and American Whitewater Affiliation (American Rivers); Ray Caughran; Tom and Billie Banse; Tom and Ann Colgin; Cisco Chain Riparian Owners Association (Cisco Chain); the U.S. Department of the Interior's (Interior) Fish and Wildlife Service (FWS); the U.S. Forest Service (Forest Service); Keweenaw Bay Indian Community (Keweenaw Indians); Lake Gogebic Improvement Association, Inc. (Gogebic Association); Michigan Department of Natural Resources (Michigan DNR); Randy Myhren; North Shore Concerned Citizens Group of Lake Gogebic (North Shore Group); Upper Peninsula Sport Fisherman's Association (Fishermen's Association); and Upper Peninsula Sportsmen's Alliance. The late interventions have been granted.

5. On June 18, 1996, the Commission issued notice that UPPCO's application was ready for environmental analysis and established a deadline of August 17, 1996, for filing comments, recommendations, terms and conditions, and prescriptions. Michigan DNR, Wisconsin DNR, and FWS on August 16, 1996, August 8, 1996, and August 12, 1996, respectively, filed comments and recommendations. The Forest Service, on August 12, 1996, filed draft Section 4(e) terms and conditions; and on May 14 and 22, 2001, in response to the Settlement Agreement, filed new preliminary Section 4(e) terms and conditions. The new Section 4(e) terms and conditions are basically identical to the terms of the Settlement Agreement, addressed herein. The Forest Service filed its final Section 4(e) terms and conditions on November 22, 2002, with no substantive changes from the preliminary filing.

6. On July 11, 2000, UPPCO filed an Agreement reached between UPPCO and 10 entities.[6] Public notice of the Agreement was issued on September 25, 2000. No comments were filed in response to the notice.

7. On December 11, 2001, the Commission staff issued a draft environmental impact statement (EIS) that evaluates the potential impacts of relicensing the Bond Falls Project and recommends issuance of a new license, as proposed by UPPCO (consistent with the Agreement), and with additional staff-recommended measures. Comments on the draft EIS were filed by Cisco Chain, Michigan DNR, Keweena Indians, Michigan Hydro Relicensing Coalition, Steve Garske, Al Warren, Northwoods Wilderness Recovery, Wisconsin Public Service Corporation, on behalf of UPPCO, the Forest Service, and Interior. The comments primarily concerned minimum flows and recreational enhancements, elevation levels, fish passage, installation of a lake outlet control structure, updated information on threatened or endangered species, invasive plant species, and timber harvest rules, minimum flow monitoring, and flow data availability.

8. Commission staff considered the comments in preparing the final EIS, which was issued on June 27, 2002. In the final EIS, staff recommended adopting the Agreement and issuing a new license with certain additional staff-recommended measures.[7] FWS filed comments in support of the

[6]The settlement signatories are UPPCO, the Forest Service, FWS, Wisconsin DNR, Michigan Hydro Relicensing Coalition, American Rivers, American Whitewater Affiliation, Keweenaw Indians, Michigan DNR, Michigan Department of the Attorney General.

[7]In a June 25, 2002 filing, the North Shore Concerned Citizens Group of Lake Gogebic (North Shore Group), an intervenor, requested that action on UPPCO's relicense application be deferred until its concern regarding funding for shoreline protection measures is satisfactorily resolved. This concern is addressed in the discussion of shoreline protection measures below. North Shore Group had also filed a complaint, alleging that water levels on the project's Lake Gogebic exceeded the maximum elevations allowed by the project license, thereby causing homes, roads, and

Agreement, and the Gogebic Association filed comments requesting modification of a staff gage reference in the final EIS.[8]

9. The motions to intervene and comments received from interested agencies and individuals throughout the proceeding have been fully considered in determining whether, or under what conditions, to issue this license.

PROJECT DESCRIPTION

10. The Bond Falls Project consists of four developments, Bond Falls[9], Bergland, Cisco, and Victoria, which are located on the Middle, South (Cisco), and West Branches of the Ontonagon River in northeastern Wisconsin and the western Upper Peninsula of Michigan. The project's Bond Falls, Bergland, and Cisco developments provide seasonal reservoir storage and divert river flows to the Victoria development, where the flows are used by the project's sole generating facility, a 12-MW hydroelectric plant. Historically, UPPCO has conducted significant winter drawdowns at Bond Falls (20 feet) and Victoria (14 feet) reservoirs. Cisco and Gogebic reservoirs, where there is substantial shoreline development, have been operated to maintain relatively constant water levels, with modest winter drawdowns.

Bond Falls Development

11. The Bond Falls development, located on the Middle Branch of the Ontonagon River, consists of a 45-foot-high, 900-foot-long main dam with a spillway; a 35-foot-high, 850-foot-long control dam; the 2,160-acre Bond Falls storage reservoir with a maximum operating elevation of 1,475.9 feet msl; and a 7,500-foot-long canal.

12. UPPCO operates the Bond Falls development to store water and to divert river flow from the Middle Branch to the South Branch through the canal. The South Branch flows into the West Branch, where river flows are used for hydroelectric generation at the Victoria development, located on the West Branch of the Ontonagon River. As currently licensed, the Bond Falls development maintains a minimum flow release of 40 cubic feet per second (cfs) during June, July, and August, and 30 cfs during the remainder of the year.

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shorelines to be flooded as far as 200 feet from the lake. The Commission determined that the licensee had not violated the license, and therefore dismissed the complaint. See North Shore Concerned Citizens Group of Lake Gogebic v. Upper Peninsula Power Company, 100 FERC ¶ 61,173 (issued August 6, 2002).

[8]The Gogebic Association indicated that the description of elevations on the Bergland staff gage (final EIS at 15) was incorrect and should be changed from "1.0 foot on the gage equals 1,293.7" to "0 foot elevation equals 1,293.7 feet msl (mean sea level)." Commission staff consulted with U.S. Geological Survey (USGS) personnel who explained that USGS reset the gaging equipment to record gage-height 1.0 foot higher, in order to prevent negative gage heights when lake levels fall below 1,293.7 msl. The gage designation in the final EIS is therefore correct.

[9]The Bond Falls development impoundment or reservoir is also known as Bond Falls Flowage.

13. As proposed in the Agreement, UPPCO will continue to divert water from the Bond Falls reservoir for power generation at the Victoria development. UPPCO will also maintain specified year-round minimum flows from Bond Falls into the Middle Branch, and reduce the maximum Bond Falls reservoir drawdown from 20 feet to 8 feet.

Bergland Development

14. The Bergland development, located on the West Branch of the Ontonagon River, consists of a 4-foot-high, 179-foot-long dam and the 276,000-acre Lake Gogebic storage reservoir. The Bergland development controls the water surface levels of Lake Gogebic, a natural lake, from which releases are used downstream for power generation at the Victoria development. Throughout the year, UPPCO maintains target water level elevations in Lake Gogebic, between the maximum normal water level of 1,296.2 feet msl and 1,294.2 feet msl, a range of 2 feet, in accordance with an agreement with the Gogebic Association.

15. The average annual outflow from the Bergland development into the West Branch is 169 cfs. Average monthly flows range from 321 cfs (April) to 77 cfs (August). There is no minimum instream flow requirement in the West Branch downstream of Bergland dam under the current license, and there are periods when only leakage flows through the plank structure of the dam.

16. As proposed in the Agreement, UPPCO will continue to use Lake Gogebic flow releases for power generation at the Victoria development with water levels similar to those under current operations. UPPCO will maintain specific seasonal and monthly minimum, maximum, and end-of-the-month target reservoir elevations and year-round minimum instream flows. Depending on the time of year and the elevation of the reservoir, UPPCO will release a minimum of 30 or 50 cfs from the Bergland development.

Cisco Development

17. The Cisco development, located in the headwaters of the Cisco Branch of the Ontonagon River, includes Cisco Lake, controlled by an 11-foot-high, 21-foot-long dam that is situated between concrete abutments and is controlled manually by placing or removing stoplogs in either of two concrete bays. Cisco Lake is on the downstream end of 15 interconnected lakes (Cisco Chain of Lakes) with a maximum water total surface area of 4,025 acres at a normal maximum surface elevation of 1,683.5 feet msl. There is no minimum instream flow requirement for the Cisco Branch.[10]

18. UPPCO has operated the Cisco development so as to maintain lake levels close to the normal maximum elevation of 1,683.5 feet msl during summer months. Between September 15 and November 1, drawdowns are limited to 1 foot, and thereafter the development releases water at the dam in basically a run-of-river mode.

19. As proposed in the Agreement, UPPCO will continue to operate the Cisco development without a minimum flow requirement. UPPCO will also operate the Cisco reservoir at or above 1,683.0 feet msl at all times, and will no longer fluctuate lake levels up to 1 foot. It will instead target the lake elevation between 1,683.4 and 1,683.9 feet msl, (0.5 foot).

[10]The Cisco Branch joins the South Branch of the Ontanagon River about 24 miles downstream of Cisco Dam.

20. The Agreement also states that UPPCO will attempt, with the Settlement Team's support, to find a new owner for Cisco Dam in order to allow it to be removed from the project license. However, the Agreement recognizes that any new owner shall be required to operate the dam according to the Operating Plan developed by the Settlement Team. If UPPCO files with the Commission to have Cisco Dam removed from the project license, UPPCO will be required to install and finance up to $75,000 (in December 1988 dollars) for a new 75-foot-long, fixed-crest spillway structure. Further, if UPPCO decides to pursue removal of Cisco Dam from the project license, UPPCO will be required to file a license amendment, that should include: (1) the reasons for removing Cisco Dam from the project license; (2) a description of the effects that removing Cisco Dam from the project would have on project operation and economics, and other resources such as recreation; (3) a statement of how Cisco Dam would be acquired (e.g., fee simple sale, etc.), maintained, and operated; and (4) consultation with and comments from the Bond Falls Project Implementation Team, Cisco Chain Riparian Owners Association, other federal, state, and local agencies, non-governmental organizations, and other appropriate parties.

Victoria Development

21. The Victoria development, located on the West Branch of the Ontonagon River, consists of a 301-foot-long, 118-foot-high dam; a gated spillway consisting of four concrete bays; the 250-acre Victoria reservoir with a maximum water surface elevation at 910 feet msl; a 9.5-foot-diameter, 6,050-foot-long, above-ground, steel pipeline connecting to a 32-foot-diameter, 120-foot-high steel surge tank, and then dividing into two, 7-foot-diameter penstocks before entering the powerhouse; two 6-MW turbine generator units; a tailrace; and a 1.6-mile-long bypassed reach. The Victoria development has an average annual generation of 72,270 MW-hours of power.

22. UPPCO operates the Victoria development to maximize energy generation during peak load periods and releases up to its maximum hydraulic capacity of about 800 cfs. Reservoir levels can fluctuate approximately 3 feet per day. UPPCO maintains the target reservoir elevation at 907.1 feet msl during the late spring, summer, and autumn, to provide maximum head for power generation. During March, UPPCO draws the reservoir down about 14 feet (to 893.1 feet msl) to allow de-icing of the spillway gates and to provide additional storage for spring runoff. UPPCO provides minimum flows of 82 cubic feet per second (cfs) below Victoria Dam in the bypassed reach of the West Branch from May 1 to June 10 of each year, unless Michigan DNR determines that such releases may be terminated at an earlier date. For the remainder of the year, there is no minimum instream flow requirement, and the bypassed reach is primarily dewatered.

23. The Victoria development will operate in a run-of-river mode during the spring for the protection of fish spawning in the West Branch of the Ontonagon River and during this period UPPCO will release flows from the powerhouse and the bypassed reach, as measured immediately downstream of the project tailwater and spillway, that approximate the sum of flows to the Victoria reservoir.[11]

THE SETTLEMENT AGREEMENT

24. The Agreement sets out the background, purpose, use, implementation, general conditions, and terms for its execution. The Agreement addresses the signatories' various concerns related to project operation, upstream fish passage, downstream fish protection, land management, project

[11]The project developments are described in greater detail in ordering paragraph (B)(2).

boundaries, water quality, woody debris management, instream flows, threatened, endangered and sensitive species management, soil and shoreline erosion control, and land-based recreational use, along with other related subjects.

Section 1.0 Background

25. Section 1 of the Agreement describes the Bond Falls Project and the project area, and identifies the parties to the Agreement.

Section 2.0 General Provisions

26. Section 2 defines the effective date of, and other terms that are used in, the Agreement; contains a schedule for implementing the Agreement 's requirements; and states the parties' preference for a 40-year license term.

Section 3.0 Project Operation and Compliance

27. Section 3.1 establishes minimum flow releases and proposed changes to basic operational modes and reservoir elevations.

28. Under the Agreement in Section 3.1.1., UPPCO will release to the Middle Branch of the Ontonagon River, immediately downstream of the Bond Falls Dam, minimum flows of 110 cfs in April, 100 cfs in May, 80 cfs from June through October, 90 cfs in November, and 80 cfs from December through March. UPPCO will release a year-round minimum flow of 25 cfs from the control dam into the canal and Roselawn Creek; release no more than 150 cfs from the control dam to the canal and Roselawn Creek from April 15 through June 15 and September 15 through November 15; and release a minimum of 25 cfs and no more than 175 cfs for the balance of the year. UPPCO will also reduce the maximum Bond Falls reservoir drawdown from 20 feet (1,455.9 msl) to 8 feet (elevation 1,467.9 to 1,475.9 feet msl) from February 1 through April 30, and 6 feet (elevation 1,469.9 to 1,475.9 feet msl) from May 1 through January 31; and control ramping rates in the Bond Falls canal ranging from 80 to 110 cfs, depending on the time of year, for the protection of aquatic resources and recreation in the Middle Branch of the Ontonagon River. A minimum flow of 25 cfs and a maximum of 150 to 175 cfs, depending on the time of the year, will be required for the Bond Falls Canal to protect downstream resources. UPPCO will make a good faith effort to meet or exceed end-of-the-month target elevations ranging from 1,468.4 feet msl to 1,474.9 feet msl at Bond Falls Flowage.

29. UPPCO will release from Bergland Dam to the West Branch of the Ontonagon River, minimum flows ranging from 30 cfs to 50 cfs, depending on the time of the year as specified in Section 3.1.3.3., for the protection and enhancement of fish and wildlife resources, water quality, aesthetic resources, and recreation. UPPCO will maintain seasonal reservoir elevation limits ranging from 1,293.7 feet msl to 1,296.2 feet msl, as specified in Section 3.1.3.1. To prevent overdrafting Lake Gogebic and control lake fluctuations, UPPCO will reduce the 50 cfs minimum flow to 30 cfs when the lake elevation is declining and the lake is at the seasonal target reservoir elevation limit specified in Section 3.1.3.3., or increase the 30 cfs minimum flow to 50 cfs when Lake Gogebic is increasing and reaches 0.1 feet above the seasonal target reservoir elevation limit specified in Section 3.1.3.3. During normal project operation, UPPCO will make a good faith effort to meet, as a minimum , the end-of-the-month target lake elevations listed in Section 3.1.3.2., ranging from 1,293.9 to 1,295.9 feet msl.

30. UPPCO will maintain Cisco Lake elevation at or above 1,683.0 feet msl at all times, target lake level elevations between 1,683.4 and 1683.9 feet msl, and develop and implement a Cisco Dam Operation Plan to ensure maintenance of the lake elevations.

31. As proposed in the Agreement in Section 3.1.2., UPPCO will continue to operate the Victoria development to generate power during peak load periods. Except during March and April, UPPCO will maintain the Victoria reservoir between elevation 905.0 and 908.0 feet msl, although this 3-foot drawdown range cannot be used on a daily basis. During March, UPPCO may draw down the reservoir to an elevation of 899.5 feet msl, but it will be required to return the reservoir to a minimum elevation of 906.6 feet msl by April 15 of each year. From April 15 through June 15, UPPCO will operate the powerhouse in a run-of-river mode, during which outflow from the powerhouse and spillway approximates inflow to the impoundment, and from June 15 through April 14, operate the powerhouse such that the minimum flow shall not be less than 50 percent of the maximum hourly generation flow from the previous day. During emergency conditions, UPPCO will provide a minimum flow of 200 cfs from the powerhouse. From April 15 through June 15, UPPCO will release a minimum flow of 150 cfs from the Victoria Dam into the bypassed reach.

32. Section 3.2. requires that, within six months of license issuance, UPPCO develop and implement an operation compliance plan in consultation with the Implementation Team established in Section 9 of the Agreement. Section 3.2. provides that UPPCO shall continue to cooperate with the United States Geological Survey (USGS) by providing 80 percent of the funding for four specified gages. UPPCO may discontinue funding for two other gages, and after 3 years, if certain conditions are met, discontinue funding for two other USGS gages.

33. Section 3.3. requires that, within six months of issuance of a new license, UPPCO file for Commission approval a reservoir drawdown plan, developed in consultation with the Bond Falls Implementation Team (Implementation Team) established in Section 9 of the Agreement.

Section 4.0 Natural Resource Management Issues

A. Water Quality

34. The Agreement, Section 4.1., provides that the Bond Falls Project shall meet specified water temperature and dissolved oxygen (DO) standards, and that UPPCO shall develop and implement a plan to monitor these parameters, and provide for subsequent monitoring based on the results of the initial three-year monitoring period.

B. Fish Passage

35. Michigan DNR agrees not to pursue upstream fish passage at the dams located at natural barriers or waterfalls (Bond Falls and Victoria).[12]

36. Interior reserves its authority, pursuant to FPA Section 18,[13] to prescribe upstream and downstream fishways at the project, after issuance of a new license.[14]

[12]Agreement, section 4.2.1.

[13]16 U.S.C. § 811.

[14]Agreement, section 4.2.3.

37. UPPCO commits to install, in consultation with the Implementation Team, a downstream fish protection device at the Victoria Dam on or about year 10 of the Settlement (tens years after license issuance).[15]

C. Soil and Shoreline Erosion Control

38. UPPCO commits to develop and implement necessary soil erosion control plans and measures for future construction activities related to project structures. UPPCO agrees to address any other soil erosion control planning or mitigation, including stream or reservoir bank rehabilitation and Lake Gogebic shoreline protection, through the Mitigation Enhancement Fund established under Section 7 of the Agreement.[16]

D. Nuisance Plant Control and Woody Debris

39. UPPCO commits to develop for each of the four developments and file for Commission approval, plans for nuisance plant control and woody debris transport and management.[17] The woody debris plan would provide for the reasonable transport of vegetative material over the project dams and would specify the vegetative material to be passed and the procedures for passing.

E. Land Use and Wildlife Protection and Enhancement

40. In the land use management provisions, the Agreement refers to "UPPCO-owned project lands."[18] The Agreement provides that all lands currently within the project boundaries of the Bond Falls Project will remain within the boundaries under the new license.[19] The Agreement further provides that the existing project boundaries[20] are deemed sufficient for all regulatory purposes and

[15]Agreement, section 4.3.

[16]Agreement, section 4.4.

[17]Agreement, sections 4.5. and 4.6.

[18]See Agreement, Sections 4.7.2. and 4.7.3. Lands within the project boundaries are owned by UPPCO, U.S. Government, Forest Service, and by others. At Bond Falls, 1,182 acres of upland land are owned by UPPCO, 73.5 acres (19.5 upland and 54 surface water) are Forest Service lands, and the remaining 1,896 acres are surface water; at Bergland, 103 acres are owned by UPPCO, while 10,197 acres are owned by others; at Cisco, 10 acres are owned by UPPCO, and 1,000 acres are owned by others; and at Victoria, UPPCO owns the 408 acres, comprising upland property. See final EIS at 86.

[19]Agreement, section 4.7.1.

[20]The project boundary of the four developments lies above the maximum reservoir elevation of each development. The project boundary line shown on the Exhibit G drawings in the application generally show distances from the maximum reservoir elevation ranging from less than 200 feet wide to several hundred feet wide. The project boundaries do not follow an elevation contour, but generally zig-zag along the shorelines of the reservoirs.

that UPPCO shall have no obligation to expand the project boundaries beyond those previously established in the current license.[21]

41. UPPCO commits to develop a buffer zone plan covering "UPPCO-owned project lands" with a management objective to achieve old growth forest[22], and a wildlife and land management plan that includes timber management, revegetation measures, and threatened, endangered, and sensitive species protection for all "UPPCO-owned project lands."[23] UPPCO agrees to develop its wildlife and land management plan consistent with the bald eagle management guidelines of FWS, the Forest Service, and Wisconsin DNR, and any future Michigan DNR bald eagle management guidelines.[24] For the protection of gray wolf den sites, UPPCO agrees to develop its wildlife and land management plan consistent with the Michigan DNR wolf management guidelines and the Ottawa National Forest Land Management Plan and any future guidelines by FWS or Wisconsin DNR. For the protection and enhancement of loons, UPPCO's land management plan shall limit camping to designated locations on Bond Falls Project lands, and site and install the specified loon nesting structures on Bond Falls Flowage and Victoria Reservoir.[25]

Section 5.0 Recreation

42. The Agreement provides that the licensee will continue to maintain the existing recreational facilities at the project[26] and provides that UPPCO will develop additional recreational facilities. The proposed recreational development[27] includes recreational fishing access and an access trail at Victoria Reservoir; construction of reservoir boat launching facilities at Victoria and Bond Falls reservoirs; a shoreline fishing access area adjacent to the Victoria Reservoir boat launch; a marked canoe portage route with put-in and take-out sites at Victoria Reservoir; dispersed boat-in camp sites on Victoria Reservoir and Bond Falls Flowage; a tailwater fishing and canoe launching area at Bergland Dam; and two flatouts for accessible fishing at Lake Gogebic (one adjacent to Bergland Dam and one in the Bergland Dam tailwater). The Agreement states that no new or improved

[21]Agreement, section 4.7.1.

[22]Agreement, section 4.7.2.

[23]Agreement, sections 4.7.3 and 4.7.5. UPPCO commits to provide for wild rice restoration and enhancement, if determined feasible by the Implementation Team. Agreement, section 4.7.4.

[24]Agreement, section 4.7.6.

[25]Agreement, section 4.7.8.

[26]Existing recreational facilities at the Bond Falls development include 48 campsites, 4 unimproved boat access sites on the reservoir, picnic areas, and an unimproved hiking trail to Bond Falls. Lake Gogebic at the Bergland development provides recreational opportunities for camping, boating, fishing, swimming, hiking, and nature viewing, most of which take place off project lands, since UPPCO owns only 1 percent of the land (103 acres) within the project boundary at Bergland Dam. Extensive recreational opportunities exist at a

[26(continued)] number of the lakes in the Cisco Chain of Lakes. The Victoria development features existing boat-in campsites on the reservoir. See final EIS at 80-85.

[27]Agreement, sections 5.1., 5.2., 5.3., and 5.4.

facilities are proposed at Cisco Chain of Lakes, but facilities may be developed, if necessary.[28] UPPCO will operate and maintain all recreation sites from ice out to ice up (May through October).

Section 6.0 Cultural Resources

43. UPPCO agrees to comply with Section 106 of the National Historic Preservation Act, including all requirements of the State Historic Preservation Officer.[29]

Section 7.0 Mitigation and Enhancement Fund

44. The Agreement provides for establishment of a Mitigation and Enhancement Fund (Fund) totaling $2.46 million (in 1997 dollars). UPPCO is required to make contributions, as adjusted annually using the Consumer Price Index, less 0.5 percent. The Fund shall be managed by the Implementation Team established under Section 9, to fund specified measures adopted in the Agreement, including nuisance plant control, water quality monitoring, endangered, threatened, and sensitive species protection, soil and shoreline erosion control, upstream fish passage facilities, fish protection effectiveness studies, and recreational enhancements.

Section 8.0 Future Dam Responsibility

45. UPPCO commits to contributing $50,000 to a fund on the twentieth and thirtieth anniversaries of the date on which a new license is issued, for use in assuring compliance with applicable Commission regulations at the end of the new license.

Section 9.0 Implementation and Oversight

46. Section 9.1 of the Agreement establishes the Implementation Team that will meet annually and will coordinate and implement the Agreement, except the water quality provisions of the Agreement, which require coordination with the Michigan Department of Environmental Quality and its Surface Water Quality Division.[30] Section 9.3 of the Agreement provides a dispute resolution mechanism for conflicts that arise among members of the Implementation Team. The team members are required to engage in good-faith negotiations for a minimum of 90 days, and if agreement is not reached by then, the team is required to engage the services of a neutral third party (such as an arbitrator) to resolve the dispute. If the third party is unsuccessful, the team will then refer the dispute to the Commission for resolution.

DAM SAFETY

47. The Bond Falls and Victoria developments have historically been lowered in the late winter to allow for storage of high flows expected each spring. The developments' ability to safely pass the spring flows is related to the amount of drawdown. Under the Agreement, the maximum allowable

[28]Agreement, section 5.3.2.

[29]Agreement, section 6.1.

[30]The Implementation Team is comprised of representatives of UPPCO, Wisconsin DNR, Michigan DNR, FWS, the Forest Service, Keewanaw Bay, an intervenor in the relicensing proceeding, and “ex-officio members,” (currently, the Michigan Hydro Relicensing Coalition).

drawdown at the Bond Falls development will be reduced from 20 feet to 8 feet and the drawdown at the Victoria development will be reduced from 14 feet to 8.5 feet.

48. The reduced drawdowns will significantly decrease the amount of capacity available to store flows during the spring run-off. This could result in the reservoirs reaching higher levels than previously experienced during past spring run-offs and increase the likelihood of earth embankments at Bond Falls and Victoria developments being overtopped.

49. The drawdowns have also historically been used for de-icing the radial gates prior to the spring run-off at the Bond Falls and Victoria developments. It is not clear what effect the limited drawdowns will have on the continued safe operation of the gates.

50. Article 301 of this order requires the licensee to prepare a report assessing the effects of the limited drawdowns on overtopping the earth embankments and de-icing the spillway gates. The licensee cannot implement the limited drawdowns described in the Agreement until the effects of the drawdowns on dam safety are reviewed by the Commission and, if necessary, remedial measures performed. The timing to comply with license articles requirements for project operations, and for filing a project operations monitoring plan and a reservoir drawdown plan stipulated in Articles 401, 404, and 406, respectively, will be determined based on the timing to comply with Article 301 (see ordering paragraph F).

SECTION 4(e) OF THE FPA

51. Section 4(e) of the FPA[31] states that the Commission may issue a license for a project on a reservation only if it finds that the license will not interfere or be inconsistent with the purposes for which the reservation was created or acquired. Section 3(2) of the FPA[32] defines reservations as including national forests. There is no evidence or allegation in this proceeding to indicate that the relicensing of the Bond Falls Project would interfere with the purposes of the Ottawa National Forest within which the project is located. I conclude that this license, as conditioned, will not interfere or be inconsistent with the purposes for which the Ottawa National Forest was created.

52. Section 4(e) also requires that a license for a project located on a United States reservation must include all conditions that the Secretary of the department under whose supervision the reservation falls shall deem necessary for the adequate protection and utilization of such reservation.[33] The Bond Falls Project is located partially within the Ottawa National Forest, which is under the Forest Service's supervision. Specifically, the Bond Falls Development occupies 73.5 acres of Forest Service lands. These lands are generally located along a portion of the southern shoreline of the Bond Falls Flowage.[34]

[31]16 U.S.C. § 797(e).

[32]16 U.S.C. § 796(2).

[33]Escondido Mutual Water Co. v. LaJolla Band of Mission Indians, 466 U.S. 765 (1984).

[34]Of the 73.5 acres of Forest Service lands, 54 acres are situated within the impoundment; the remaining 19.5 acres are located along the shoreline, above the high water contour.

53. On November 22, 2002, the Forest Service, a signatory to the Agreement, filed 17 final conditions for the project pursuant to FPA Section 4(e). Condition 1 reserves the Forest Service's right to modify the Section 4(e) terms and conditions. Conditions 2, 3, and 4, respectively, require UPPCO to: (1) comply with all laws, ordinances, and regulations relating to the area or operation covered by the project license, to the extent federal law does not preempt them; (2) prepare site-specific plans for all habitat and ground-disturbing activities on Forest Service lands; (3) obtain approval from the Forest Service for any changes to as-licensed project works or operations on Forest Service lands. The remaining 13 conditions include, verbatim, the provisions of the Agreement. Of these conditions, only seven include provisions that qualify as mandatory conditions under Section 4(e). These seven conditions (Conditions 6, 8, 9, 10, 11, 12, and 13) pertain to the Bond Falls Development impoundment only, and not to the downstream conditions. The remaining conditions apply to the project's other three developments, which do not occupy Forest Service lands.

54. Condition 6 includes a reporting requirement for operational compliance at the Bond Falls Development. Condition 8 provides for the control of nuisance aquatic plants, potential restoration and enhancement of wild rice, woody debris transport and management, and a requirement to maintain current project lands for Bond Falls Flowage. Condition 9 requires the protection and enhancement of threatened and endangered species for Bond Falls Flowage. Condition 10 requires UPPCO to develop and implement soil erosion control plans and measures. Condition 11 holds UPPCO responsible for compliance with Section 106 of the National Historic Preservation Act. Condition 12 calls for UPPCO to enhance and maintain recreation sites at Bond Falls Flowage. Lastly, Condition 13 provides that the maximum annual fluctuation of water levels in the Bond Falls Flowage will be 8.0 feet, and requires specific monthly reservoir elevations. As discussed below, the remaining 10 conditions are included in the license under the Commission's comprehensive development authority provided for in Section 10(a) of the FPA,[35]

WATER QUALITY CERTIFICATION

55. Under Section 401(a)(1) of the Clean Water Act (CWA),[36] the Commission may not issue a license for a hydroelectric project unless the state water quality certifying agency has issued a water quality certification (WQC) for the project or has waived certification by failing to act on a request for certification within a reasonable period of time, not to exceed one year. Certification (or waiver) is required in connection with any application for a federal license or permit to conduct an activity which may result in a discharge into U.S. waters. Section 401(d) of the CWA provides that state certification shall become a condition of any federal license or permit that is issued.[37]

56. The Bond Falls Project has identifiable discharges in both Wisconsin and Michigan. Therefore, both states are empowered by Section 401(a)(1) of the CWA to issue water quality certification.

57. UPPCO requested water quality certification for the Bond Falls Project from Wisconsin DNR on December 16, 1987. By letter dated March 24, 1988, Wisconsin DNR waived water quality certification.

[35] 16 U.S.C. §803(a).

[36] 33 U.S.C. § 1341(a)(1).

[37] 33 U.S.C. § 1341(d).

58. UPPCO requested water quality certification for the project from Michigan DNR on April 10, 1986. When UPPCO had not received a response to its certification request after more than a year, it contacted Michigan DNR and the agency responded by letter dated March 18, 1988, stating that because there were unresolved issues concerning impoundment water levels and minimum flow releases and diversions from the reservoir, it "cannot issue a 401 Certification unless and until all issues regarding these topics are resolved." In 1994, Michigan DNR reviewed UPPCO's entire license application and by letter dated May 11, 1994, advised UPPCO that its 1991 response to an additional information request had materially changed the original application by changing the proposed minimum flows below Bond Falls reservoir and the proposed operation of the Victoria powerhouse. In addition, Michigan DNR asserted that the proposed operation of the project was likely to change as a result of UPPCO's planned Instream Flow Incremental Methodology study (for the bypassed river reach below the Victoria powerhouse), which UPPCO subsequently completed in December 1995.

59. The Commission's regulations require an applicant to submit a new request for a water quality certification if an amendment to the license application would have a material adverse impact on the water quality in the discharge from the project.[38] The Commission's regulations do not require UPPCO to reapply in this case because the company did not file either a material amendment to its license application under Section 4.35,[39] nor would the changes proposed by UPPCO have a material adverse impact on the water quality in the discharge from the project within the context of Section 16.8(f)(7)(iii). Because Michigan DNR did not act on the certification request within one year after the date of the initial request, Michigan DNR is deemed to have waived certification for the Bond Falls Project.

COASTAL ZONE MANAGEMENT ACT

60. Under Section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA),[40] the Commission cannot issue a license for a hydropower project within or affecting a state's coastal zone, unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's federally-approved CZMA program, or unless the state waives such concurrence.

61. On April 14, 1997, the Michigan Department of Environmental Quality issued a finding that the Bond Falls Project is located outside of Michigan's coastal boundaries.

HISTORIC PROPERTIES

62. On December 30, 1993, the Wisconsin State Historic Preservation Officer, the Michigan State Historic Preservation Officer, the Advisory Council on Historic Preservation, and the Commission executed a Programmatic Agreement (PA) for managing historic properties that may be

[38] See 18 C.F.R. § 16.8(f)(7)(iii).

[39] Section 4.35(b)(1) describes an amendment as a change ". . .to materially amend the proposed plans of development . . ." 18 C.F.R. §4.35(b)(1)(2002). UPPCO's response to the additional information request was not filed as an amendment to its application nor did the Commission subsequently determine that UPPCO's filing constituted an amendment to the license application.

[40] 16 U.S.C. §1456(c)(3)(A).

affected by relicensing the Bond Falls Project in the state of Michigan and adjacent portions of Wisconsin. Incorporating the PA in this license satisfies the Commission's responsibilities under Section 106 of the National Historic Preservation Act.[41]

THREATENED AND ENDANGERED SPECIES

63. Section 7(a)(2) of the Endangered Species Act of 1973 (ESA)[42] requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species, or result in the destruction or adverse modification of their designated critical habitat. The federally-listed endangered gray wolf and the federally-listed threatened bald eagle and Canada lynx are known to inhabit areas within the boundaries of the Bond Falls Project. No critical habitat has been designated in the project area for any of these species.

64. On July 31, 2002, pursuant to Section 7(a)(2) of the ESA, Commission staff submitted a biological assessment (BA) to the FWS. The BA concluded that, with staff's recommended measures, the proposed project is not likely to adversely affect the bald eagle, gray wolf, and Canada lynx. FWS notified the Commission that it concurred with staff's finding that relicensing would not adversely affect the gray wolf and Canada lynx provided the licensee follows the wolf management guidelines of the State of Michigan, the Wisconsin DNR guidelines, and the Ottawa National Forest Land Management Plan guidelines for the protection of den sites on all project lands, and consults with the Implementation Team, on any proposed road construction.[43] The FWS further concluded that relicensing is not likely to adversely affect the bald eagle, provided the land management and bald eagle management guidelines are adopted in the license, and the FWS is notified of any proposed development. The new license issued for Project
No. 1864 (Article 415) includes such conditions.

FISHWAY PRESCRIPTIONS

65. Section 18 of the FPA[44] provides that the Commission shall require the construction, maintenance, and operation by a licensee of such fishways as the Secretaries of the U.S. Departments of Commerce and of the Interior may prescribe. By letter dated August 12, 1996, Interior requested the Commission to reserve in the license its authority to prescribe fishways. Consistent with the Commission's policy, Article 418 of this license reserves the Commission's authority to require fishways that may be prescribed by Interior for the Bond Falls Project.

RECOMMENDATIONS OF FEDERAL AND STATE FISH AND WILDLIFE AGENCIES

66. Section 10(j)(1) of the FPA[45] requires the Commission, when issuing a license, to include conditions based on recommendations of federal and state fish and wildlife agencies submitted

[41] 16 U.S.C. §470s.

[42] 16 U.S.C. §1536(a).

[43] See letter dated August 23, 2002, from Interior's Fish and Wildlife Service to the Commission Secretary, filed September 3, 2002.

[44] 16 U.S.C. § 811.

[45] 16 U.S.C. § 803(j)(1).

pursuant to the Fish and Wildlife Coordination Act,[46] to "adequately and equitably protect, mitigate damages to, and enhance, fish and wildlife (including related spawning grounds and habitat)" affected by the project.

67. Interior, Wisconsin DNR, and Michigan DNR submitted recommendations under FPA Section 10(j) for the Bond Falls Project on August 13, 1996, August 14, 1996, and August 16, 1996, respectively. These agencies are signatories to the Agreement, and it is assumed that they intend the terms in the Agreement to supersede the recommendations which they filed in 1996.

COMPREHENSIVE PLANS

68. Section 10(a)(2)(A) of the FPA[47] requires the Commission to consider the extent to which a hydroelectric project is consistent with federal and state comprehensive plans for improving, developing, or conserving waterways affected by the project.[48] Under Section 10(a)(2)(A), federal and state agencies filed 120 comprehensive plans that address various resources in Michigan and Wisconsin. Of these, the Commission staff identified and reviewed ten relevant to this project.[49] No inconsistencies were found.

DISCUSSION

69. The Commission encourages settlement agreements that resolve licensing issues in the public interest. The parties are to be commended for their extensive and ultimately successful efforts in reaching consensus on the broad range of issues related to the operation of the Bond Falls Project.

70. The Agreement provides for increased minimum flows, reduced reservoir drawdowns, maintenance of water quality standards, management of woody debris and riparian buffer zones, protection of threatened, endangered, and sensitive species, nuisance plant control, and fish passage measures. The Agreement also provides for cultural resources protection and additional recreational resources in the project vicinity. These measures will protect and enhance fish, wildlife, water quality, and aquatic resources of the Ontonagon River. For example, increased minimum flows will significantly enhance canoeing opportunities in the Middle Branch and will benefit fish species throughout the lower Ontonagon River system by reducing the potential for fish stranding, increasing

[46] 16 U.S.C. § 661 et seq.

[47] 16 U.S.C. § 803(a)(2)(A).

[48] Comprehensive plans for this purpose are defined at 18 C.F.R. § 2.19 (2002).

[49] (1) U.S. Forest Service, Ottawa National Forest Land and Resource Management Plan, 1986; (2) Great Lakes Fishery Commission, Fish Community Objectives for Lake Superior, 1993; (3) Michigan Department of Natural Resources, 1997. MDNR Draft Strategic Plan; (4) MDNR, 1991-1996 Michigan Recreation Plan, 1991; (5)Wisconsin Department of Natural Resources (WDNR), Wisconsin Water Quality Assessment Report to Congress, 1992; (6) WDNR, Wisconsin Statewide Comprehensive Outdoor Recreation Plan for 1991–1996, 1991; (7) U.S. Fish and Wildlife Service (FWS) and Canadian Wildlife Service, North American Wildlife Management Plan, 1986; (8) FWS and Canadian Wildlife Service, North American Waterfowl Management Plan, 1986;
(9) FWS, Fisheries USA: The Recreational Fisheries Policy of the U.S. Fish and Wildlife Service, undated; and (10) National Park Service. 1982. The nationwide rivers inventory. Department of the Interior, Washington, DC. January 1982. 432 pp.

spawning habitat for important migratory fish, including walleye, brown trout, steelhead, chinook salmon, coho salmon, and lake sturgeon, and increasing habitat area for important resident game fish populations, including brown trout, smallmouth bass, and walleye.[50]

71. For licensed projects, the Commission's authority extends only over the licensee; thus, the Commission can enforce all license terms, of whatever origin, that deal with the licensee's construction, operation, and maintenance of the licensed project, including environmental measures. Although there are provisions of the Agreement that impose obligations that do not come under the Commission's authority over the license or the licensee, or otherwise impose obligations that are beyond the Commission's jurisdiction to enforce,[51] they do not conflict with the license articles adopted for the project or interfere with the Commission's statutory authority. The license incorporates all of the provisions of the Agreement requiring specific licensee action to provide environmental measures for project impacts.

72. As previously stated, the land use management provisions of the Agreement describe UPPCO's commitment to develop a buffer zone plan and a wildlife and land management plan for all "UPPCO-owned project lands."[52] A licensee's responsibilities extend not only to licensee-owned lands, but to all lands within the project boundaries. Therefore, the terms and conditions of this license apply to all project lands.

OTHER ISSUES

Wild and Scenic River Designations

73. Section 7(a) of the Wild and Scenic Rivers Act (Rivers Act), 16 U.S.C. § 1278(a), bars the Commission from licensing "the construction of" any dam, water conduit, or other project works "on or directly affecting any river which is designated as a component of the national wild and scenic rivers system ... ."

74. Under Section 7(a) of the Rivers Act, the Forest Service is responsible for determining if a development below or above a designated river will "invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the area at the date of designation." Section 7(b) requires the Forest Service to determine if a development below or above a potential Wild and Scenic River will "invade the area or diminish the scenic, recreational, and fish and wildlife values present in the area at the date of designation of a river for study."

75. Mr. Myhren and the Fishermen's Association, intervenors in the proceeding, point out that the Ontonagon River is under consideration as a Wild and Scenic River[53] and suggest that relicensing of the Bond Falls Project may affect the protected status of the river.

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[50]See final EIS at 192-193.

[51]For example, Sections 1.0 through 2.2 contain general information, but impose no requirements on the licensee. Sections 2.3 through 2.4 and 9.0 address procedural requirements of the Agreement (enforceability, coordination, dispute resolution) that are binding on the parties to the Settlement. Such provisions are not included in the license.

[52]Agreement, Sections 4.7.2 and 4.7.3.

[53]Almost all of the Ontonagon River tributaries within the project boundaries are designated wild, scenic, recreation, and/or "study" rivers under the Wild and Scenic Rivers Act (Rivers Act), 106

76. Section 7(a) does not bar the issuance of a license for its continued operation, as long as no new construction is proposed,[54] and UPPCO proposes no new construction in its relicense application. In this case, the Forest Service did not submit conditions under Section 7(a) and (b) of the Rivers Act. In any event, Section 4.1 of the Agreement requires UPPCO to protect and enhance water quality, thereby protecting and improving the resource values of the Ottawa National Forest, including the wild and scenic rivers.

77. The Forest Service's Section 7 determination is that "there are no direct and adverse effects to the free-flowing condition of the river, or to the outstandingly remarkable values that are not mitigated by project design and/or permitting agency requirements and incorporated through reference in this analysis". Further, the Forest Service finds "that reasonable precautions and mitigations have been included within the scope of the proposed activity".[55]

Shoreline Protection Measures

78. North Shore Group, an intervenor, states that shoreline owners at Lake Gogebic have suffered extensive damage as a result of erosion caused by the project. North Shore Group has requested that the Commission defer action on the relicense application until it receives a satisfactory resolution for funding shoreline protection measures. In its complaint, filed May 28, 2002, North Shore Group proposed that they be allowed to install necessary barriers and be fully reimbursed by the Mitigation Fund Committee that is to be established pursuant to the Agreement.

79. Pursuant to the Agreement, UPPCO is committed to developing and implementing necessary soil erosion control plans and measures, and it specifically agrees to address Lake Gogebic shoreline protection through the Mitigation Enhancement Fund as required in the Agreement.[56] Article 410 provides that the licensee shall be fully responsible for funding and implementing appropriate shoreline protection measures at all project facilities and recreation sites that are owned and operated solely by the licensee, and for other shoreline areas required by the Commission. Article 410 also requires the licensee to assist and cooperate with various entities, including private property owners to minimize the adverse effects of shoreline erosion.

80. In addition, Article 401 stipulates that UPPCO delay increasing the Lake Gogebic water level if ice cover on the lake is sufficient to cause damage to shoreline structures.

81. The establishment of the Mitigation Enhancement Fund is an appropriate approach for addressing shoreline protection measures. While the Commission may include in the license a

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Stat. 47. In 1991, 143 miles of the Ontonagon River system within the Bond Falls Project area, encompassing segments of the Cisco, Middle, South, and West Branches of the Ontonagon River, were federally designated as a Wild and Scenic River, including, wild, scenic, recreational, and study segments.

[54] See Northern States Power Company, 67 FERC ¶ 61,282 (1994).

[55] See the Forest Service Final Supplemental EIS for the Bond Falls Project at J-18,

[55(continued)] November 2002.

[56] See Agreement, Section 7.

condition requiring the Mitigation Enhancement Fund, the Commission does not oversee management of such a fund. Accordingly, North Shore Group must negotiate with UPPCO the terms for disbursing monies to fund the installation of barriers. There is no demonstrated reason why the Commission should defer relicensing of the Bond Falls Project while the parties work out details on the disbursement of funds.[57]

Minimum Flows

82. Numerous letters filed with the Commission assert that the Bond Falls Project has adversely affected recreational fishing, hunting, canoeing, boating, and camping, because of historically low flows in the Middle Branch of the Ontonogan River. Mr. Kananen, Mr. Caughran, Mr. Myhren, the Banses, the Colgins, and the Fishermen's Association, who intervened but did not become signatories to the Agreement, ask that the new license require increased flows.

83. Under the existing license, UPPCO released minimum flows ranging from 30 to 40 cfs. The new license provides for increased minimum flows immediately downstream of the Bond Falls Dam ranging from 80 to 110 cfs.

Request for a Hearing

84. In its motion to intervene, the Fishermen's Association requested that the Commission set a hearing for the relicensing proceeding. When, as here, a paper hearing provides a sufficient basis for resolving the material issues of fact in a proceeding, a trial-type evidentiary hearing is not necessary.[58]

APPLICANT'S PLANS AND CAPABILITIES

85. In accordance with Sections 10(a)(2)(C) and 15(a) of the FPA,[59] staff has evaluated UPPCO'S record as a licensee with respect to the following: (A) conservation efforts; (B) compliance history and ability to comply with the license; (C) safe management, operation, and maintenance of the project; (D) ability to provide efficient and reliable electric service; (E) need for power; (F) transmission services; (G) cost effectiveness of plans; (H) actions affecting the public; and (I) ancillary services. I accept the staff's findings in each of the following areas.

[57]The North Shore Group asks for a federal takeover of the Bond Falls Project, if its concerns are not satisfied by UPPCO. Section 14(b) of the FPA, 16 U.S.C. § 807(b), reserves to the United States the right to take over a non-publicly owned project upon expiration of the license, after paying to the licensee the net investment in the project, not to exceed the fair value of the property taken, plus severance damages, if any. There is no evidence to indicate that Federal takeover should be recommended to Congress in this case. No federal agency or department has expressed an interest in operating the project, recommended federal takeover, or objected to relicensing of the Bond Falls Project, and the project does not conflict with any project authorized or under study by the United States.

[57(continued)] Moreover, there appears to be no reason why federal takeover of the project would better serve the public interest than issuance of a license. Accordingly, federal takeover will not be recommended.

[58]See Citizens for Allegan County v. FPC, 414 F.2d 1125 (D.C. Cir. 1969).

[59]16 U.S.C. §§ 803(a)(2)(C) and 808(a).

A. Conservation Efforts (Section 10(a)(2)(c))

86. FPA Section 10(a)(2)(C) requires the Commission to consider the extent of electric consumption efficiency programs in the case of license applicants primarily engaged in the generation or sale of electricity. Based on the information detailed in the application, staff concludes that UPPCO has made a good faith effort to reduce consumption and increase efficiency for its customers and to comply with section 10(a)(2)(C) of the FPA.

B. Compliance History and Ability to Comply with the New License (Section 15(a)(2)(A))

87. The staff reviewed UPPCO's license application and other submissions in an effort to judge its ability to comply with the articles, terms, and conditions of any license issued, and with other applicable provisions of Part I of the FPA. UPPCO has generally complied with the terms and conditions of the existing license, and has made timely filings with the Commission. The staff concludes that UPPCO has or can acquire the resources and expertise necessary to carry out its plans and comply with all articles and terms and conditions of a new license.

C. Safe Management, Operation, and Maintenance of the Project (Section 15(a)(2)(B))

88. UPPCO owns and operates the Bond Falls Project. The project dams and appurtenant facilities are subject to Part 12 of the Commission's regulations concerning project safety. The staff reviewed UPPCO's management, operation, and maintenance of the project pursuant to the requirements of Part 12 and the associated Engineering Guidelines, including all applicable safety requirements such as warning signs and boat barriers, Emergency Action Plan, and Independent Consultant's Safety Inspection Reports. As the project currently operates, we conclude the project structures are safe and there is no reason to deny issuance of a new license based on the owner's record of managing, operating, and maintaining these facilities.

89. However, limiting reservoir drawdowns for the Bond Falls and Victoria developments with UPPCO's proposed project operation may affect the impoundment earth embankments by overtopping, and cause de-icing problems at the spillway gates. Article 30l of this order requires UPPCO to prepare and file a report describing effects of limiting the reservoir drawdowns in accordance with the settlement agreement on overtopping earth embankments and de-icing the spillway gates. This report must be accepted by the Commission and the construction of any remedial measures completed, if necessary, before the drawdown scenarios are implemented. These conditions would insure continuing safe operation of the project.

D. Ability to Provide Efficient and Reliable Electric Service (Section 15(a)(2)(C)

90. The staff reviewed UPPCO's plans and its ability to operate and maintain the project in a manner most likely to provide efficient and reliable electric service. UPPCO has operated the project in an efficient and reliable manner under the provisions of the existing license, and staff concludes that it would continue to provide efficient and reliable electric service in the future.

E. Need for Power (Section 15(a)(2)(D))

91. To assess the need for power, the staff reviewed UPPCO’s use of the project's power, together with that of the operating region in which the project is located. The Bond Falls Project has historically generated 72,270 MWh of electricity annually. This electricity from a non-polluting

renewable source currently helps meet a growing demand. Without the Bond Falls Project, UPPCO would have to either: (1) purchase power; (2) install additional diesel generators; or (3) purchase other hydroelectric facilities.

92. The project is located in the Mid-America Interconnected Network (MAIN) Region of the North American Electric Reliability Council (NERC). MAIN's most recent report (MAIN, 2002) summarizing annual supply and demand projections indicates that from 2002 through 2011, generation resources within the MAIN region, including generation from the Bond Falls Project, will be adequate to meet required reserve margins within the region. This projection assumes the placement in service of a number of new gas-fired peaking units, as well as the import of generation from other regions during high-demand conditions. Power produced by the project is needed to reduce required purchases into the MAIN region and to offset fossil-fueled generation.

93. The present and future use of the Bond Falls Project power, its displacement of nonrenewable fossil-fired generation, and contribution to a resource diversified generation mix, support a finding that the power from the project would help meet both a need for power in the MAIN region in both the short and long term.

F. Transmission Services (Section 15(a)(2)(E))

94. UPPCO can operate with purchased power replacing its project generation with no detrimental effects on line loading, line losses, or requirements of new construction of transmission facilities or upgrading of existing facilities. UPPCO's transmission lines need no improvements, and will also not be affected by the outcome of the licensing action because the license to be issued will authorize the project to operate with the same installed capacity as the previous license.

G. Cost-Effectiveness of Plans (Section 15(a)(2)(F))

95. UPPCO is not proposing any new capacity expansion of the Bond Falls Project. The project, under a new license, would continue to operate as an integrated system of storage reservoirs and dams providing for the regulation and storage of streamflow, flood control, diversion and power generation at the Victoria Development with some operational changes. The project, with all the proposed and recommended environmental measures included as part of this license, would produce about 64,300 MWh of power annually. We conclude that the project, as presently configured and as operated according to this order, is consistent with environmental considerations, and fully develops the economical hydropower potential of the site in a cost-effective manner.

H. Actions Affecting the Public (Section 15(a)(3)(A) and (B))

96. UPPCO sells all the power generated by the project to its customers. UPPCO pays taxes annually to local and state governments, and the project provides employment opportunities and attracts those interested in various forms of available recreation. Staff concludes that UPPCO would follow through with the implementation of the various environmental enhancement measures proposed in the Agreement and approved in this license. These measures, discussed elsewhere, herein, and in the final EIS, as well as the power generated by the project, would benefit the public.

I. Other Factors: Ancillary Services

97. In analyzing public interest factors, the Commission takes into account that hydroelectric projects offer unique operational benefits to the electric utility system (ancillary benefits). These benefits include their value as almost instantaneous load-following response to dampen voltage and

frequency instability on the transmission system, system-power-factor-correction through condensing operations, and a source of power available to help in quickly putting fossil-fuel based generating stations back on line following a major utility system or regional blackout.

98. Ancillary services are now mostly priced at rates that recover only the cost of providing the electric service at issue, which do not resemble the prices that would occur in competitive markets. As competitive markets for ancillary services begin to develop, the ability of hydro projects to provide ancillary services to the system will increase the benefits of the project.

COMPREHENSIVE DEVELOPMENT

99. Sections 4(e) and 10(a)(1) of the FPA,[60] respectively, require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife, the protection of recreational opportunities, and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. The decision to license this project, and the terms and conditions included herein, reflect such consideration.

100. In determining whether a proposed project will be best adapted to a comprehensive plan for developing a waterway for beneficial public purposes, the Commission considers a number of public interest factors, including the economic benefits of project power.

101. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp*.,[61] the Commission employs an analysis that uses current costs to compare the costs of the project and likely alternative power, with no forecasts concerning potential future inflation, escalation, or deflation beyond the license issuance date. The basic purpose of the Commission's economic analysis is to provide a general estimate of the potential power benefits and the costs of a project, and of reasonable alternatives to project power. The estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license. In making its decision, the Commission considers the project power benefits both with the applicant's proposed measures and with the Commission's modifications and additions to the applicant's proposal.

102. As proposed by UPPCO, and taking into account the estimated costs of the Settlement Agreement, the Bond Falls Project would produce an average of 64,300 MWh of energy annually at an annual cost of about $2,773,600 or 43.13 mills per kilowatt-hour (mills/kWh). Based on the cost of replacing the project's on and off-peaking power, the annual value of the project's power would be about $2,406,800 or 37.43 mills/kWh.[62] To determine if the project would be economically beneficial, we subtract the project's cost from the value of the project's power. Thus, the project's power would cost about $366,800 or 5.70 mills/kWh more than available alternative power, which comprises the actual requirements of the existing license (i.e., the alternative of No Action or least-cost alternative).

[60] 16 U.S.C. §§ 797(e) and 803(a)(1)

[61] 72 FERC ¶ 61,027 (1995).

[62] Power produced by the project is needed to reduce required purchases into the Mid-America Interconnected Network (MAIN) region and to offset fossil-fueled generation.

103. Staff recommends three measures, in addition to the Settlement Agreement. These measures include establishing a recreation telephone line, with an annual cost of $600 (Article 416), and allowing for a delay in the minimum elevation increase in Lake Gogebic surface elevation to protect shoreline structures from ice damage (no cost), after consultation with the Implementation Team (Article 401). The cost associated with preparing a dam safety report required by Article 301 is unknown and, therefore, not estimated.

104. Our evaluation of the economics of the proposed action and the proposed action with additional staff recommended measures shows in each analysis, that project energy would cost more than alternative energy. However, project economics is only one of the many public interest factors that is considered in determining whether or not to issue a license, and operation may be desirable for other reasons. For example, other public interest factors are to: (a) diversify the mix of energy sources in the area; (b) promote local employment; and (c) provide a fixed-cost source of power and reduce contract needs. In any event, it is the licensee which must make the business decision of whether to pursue the license in view of what appear be the net economic costs of the project.

105. Based on our independent review and evaluation of the Bond Falls Project, recommendations from the resource agencies and other stakeholders, and the no-action alternative, as documented in the final EIS, I have selected the Bond Falls Project, with the staff-recommended measures, as the preferred alternative.

106. I selected this alternative because: (1) issuance of a new license would serve to maintain a beneficial, dependable, and an inexpensive source of electric energy; (2) the required environmental measures would protect and enhance fish and wildlife resources, water quality, recreational resources, and historic properties; and (3) the 12-MW of electric energy generated from a renewable resource would continue to offset the use of fossil-fueled, steam-electric generating plants, thereby conserving nonrenewable resources and reducing atmospheric pollution.

107. The preferred alternative includes the following measures:

(1) modify allowable draw downs at Bond Falls and Victoria reservoirs, and delay raising the minimum Lake Gogebic elevation if ice cover is present (Article 401);

(2) increase minimum flows in the Middle Branch, West Branch, Victoria bypassed reach, and Bond Falls diversion canal (Article 402);

(3) provisions to modify reservoir levels required by Article 401 and minimum flows required by Article 402 during dry water years (Article 403);

(4) develop a project operations monitoring plan for the requirements of Articles 401 and 402 (Article 404);

(5) install a downstream fish passage device at the Victoria Dam (Article 405);

(6) develop a reservoir drawdown plan (Article 406);

(7) develop a Cisco Dam operation plan (Article 407);

(8) maintain water quality standards (temperature and dissolved oxygen) (Article 408);

(9) develop a water quality monitoring plan, and mitigation of temperature and dissolved violations (Article 409);

(10) develop an erosion and sediment control plan (Article 410);

(11) develop a nuisance plant control plan (Article 411);

(12) develop a woody debris transport and management plan (Article 412);

(13) develop a buffer zone plan (Article 413);

(14) develop a wildlife and land management plan (Article 414);

(15) develop a threatened and endangered species plan (Article 415);

(16) develop a recreation plan for the Bond Falls Project (Article 416);

(17) establish a Bond Falls Project Implementation Team (Article 417);

(18) reserve the Commission's authority to require fishways that may be prescribed by the Secretary of the Interior (Article 418);

(19) implement the Programmatic Agreement, including the HRMP Article 419);

(20) comply with the dispute resolution procedural requirements of the Agreement (Article 420); and

(21) establish a responsibility fund for use in complying with Commission regulations (Article 421).

LICENSE TERM

108. Section 15(e) of the FPA[63] provides that any new license issued shall be for a term which the Commission determines to be in the public interest, but the term may not be less than 30 years nor more than 50 years.

109. The Commission's general policy is to establish 30-year terms for projects that propose little or no redevelopment, new construction, new capacity, or environmental mitigative and enhancement measures; 40-year terms for projects that propose moderate redevelopment, new construction, new capacity, or mitigation and enhancement measures; and 50-year terms for projects that propose extensive redevelopment, new construction, new capacity, or enhancement.

110. In Section 2.5 of the Agreement, the signatories agree to a 40-year license term. In 1991, UPPCO completed reconstruction of the Victoria dam and related facilities costing approximately $14,000,000. UPPCO also completed a $6,000,000 replacement of the woodstave pipeline with a spiral wound steel pipeline in 2001. In light of these expenditures and the enhancement measures and operational changes proposed pursuant to the Agreement, a term of 40 years is appropriate. Accordingly, the new license for the Bond Falls Project will have a term of 40 years.

[63] 16 U.S.C. § 808(e).

SUMMARY OF FINDINGS

111. The final EIS contains background information, analysis of impacts, and support for related license articles. The design of this project is consistent with the engineering standards governing dam safety. The project will be safe if operated and maintained in accordance with the requirements of this license.

112. Based upon the review of the agency and public comments filed on the project, and the Commission staff's independent analysis under Sections 4(e), 10(a)(1), and 10(a)(2) of the FPA, I conclude that issuing a license for the Bond Falls Project, with the required environmental measures, and other special conditions, will be best adapted to the comprehensive development of the Ontonagon River for beneficial public uses.

The Director orders:

(A) This license is issued to Upper Peninsula Power Company (licensee), for a period of 40 years, effective the first day of the month in which this order is issued, to operate and maintain the Bond Falls Hydroelectric Project. This license is subject to the terms and conditions of the Federal Power Act (FPA), which is incorporated by reference as part of this license, and to the regulations the Commission issues under the provisions of the FPA.

(B) The project consists of four developments on the Middle Branch, Cisco Branch, and West Branch of the Ontonagon River. The Bond Falls, Bergland, and Cisco developments provide seasonal storage and diversion of river flow to the Victoria development, which is the only power-producing facility within the project.

(1) All lands, to the extent of the licensee's interest in those lands, enclosed by the project boundary shown by Exhibit G, filed December 24, 1987, except for the project transmission line:[64]

Exhibit G Drawing	Drawing No. 1864	Description
Sheet G-1	1001	General Area Map
Sheet G-2	1002	Storage Reservoir and Canal-Bond Falls Development
Sheet G-3	1003	Storage Reservoir -Bond Falls Development
Sheet G-4	1004	Bergland Development
Sheet G-5	1005	Bergland Development
Sheet G-6	1006	Cisco Development
Sheet G-7	1007	Victoria Development

[64]The project transmission line shown on the Exhibit G map of the December 24, 1987 filing was eliminated as a project facility by an Order Amending License, 57 FERC ¶ 62,190, December 9, 1991.

(2) The project consists of:

Bond Falls Development

The Bond Falls Development project works consist of: (1) a main dam consisting of a 45-foot-high, 900-foot-long earthfill embankment with a sheet pile core wall, and a 26-foot-long concrete overflow spillway (crest elevation of 1,462.9 feet msl) with discharge controlled by a 13-foot-high by 26-foot-wide steel radial crest gate; (2) the 2,160-acre Bond Falls reservoir with a maximum water surface elevation of 1,475.9 feet msl; (3) an outlet structure consisting of (a) a 7.5-foot-high by 5-foot-wide concrete intake equipped with a trashrack, (b) a 2.75-foot-high by 2.5-foot-wide concrete intake conduit, (c) a gate well and house, (d) a clapper valve upstream and a dish valve downstream, (e) two 24-inch-diameter discharge pipes, and (f) receiving basins; and (4) a control dam consisting of a 35-foot-high and 850-foot-long earthfill embankment with a steel sheet pile core wall, a 13.8-foot-high by 10-foot-wide concrete intake equipped with a trashrack; and three earthfill dikes on the rim of the reservoir consisting of one 15-foot-high, 250-foot-long, and 35-foot-wide, and two 5-foot-high, 110-foot-long, and 20-foot-wide; (5) a 20-foot-high, 7,500-foot-long trapezoidal canal; and (6) appurtenant facilities.

The Bond Falls Development has no power generating capability.

Bergland Development

The Bergland Development consists of: (1) the 4-foot-high and 179-foot-long Bergland dam consisting of 24 bays, each 7-feet- wide, and a series of wooden stoplogs stacked between steel I-beams; and (2) the 14,080-acre Lake Gogebic at a maximum operating elevation of 1,296.2 feet msl, and a gross storage capacity of 276,000 acre-feet. The Bergland Development has no power generating capability.

Cisco Development

The Cisco Development consists of: (1) the 11-foot-high and 21-foot-long Cisco dam on Cisco Lake consisting of a timber-decked concrete level control structure; and (2) the Cisco Chain of Lakes consisting of 15 interconnected lakes with a maximum surface area of 4,025 acres, at a maximum operating elevation of 1,683.5 feet msl. The Cisco Development has no power generating capability.

Victoria Development

The Victoria Development consists of: (1) a new 301-foot-long and 118 foot-high roller-compacted concrete dam[65]; (2) the 250-acre Victoria reservoir with a maximum operating elevation of 910 feet, and an effective storage area of 3,300 acre-feet at a drawdown of 14 feet; (3) a gated spillway consisting of four concrete bays, equipped with steel radial gates, 22 feet wide by 13 feet

[65] The original Victoria dam was replaced in 1991 with a roller-compacted concrete gravity dam that was constructed 15 feet downstream of the original dam. The upper portion of the original dam was removed after the replacement dam was constructed. The remainder of the original dam was left in place.

high; (4) a new 9.5-foot-diameter, 6,050-foot-long above-ground steel pipeline;[66] (5) a 32-foot-diameter, 120-foot-high steel surge tank (capacity 491,300 gallons); (6) a 10-foot-diameter steel penstock that bifurcates into two 7-foot-diameter penstocks before entering the powerhouse; (7) a 30-foot-wide by 82-foot-long by 50-foot-high powerhouse; (8) generating facilities consisting of two 6-MW Francis-type vertical shaft turbine-generator units, each unit rated at 9,300 horsepower (hp) at 210 feet of head and 300 revolutions per minute (rpm); (9) a tailrace; and (10) a 1.6-mile-long bypassed reach.

The project works generally described above are more specifically described in Exhibit A (pages A-1 through A-16) and Exhibit F (F-1 through F-5) of the license application filed December 24, 1987, except for the Victoria Development. New
Exhibit F Drawings are being required in this order for the Victoria Development to update the changes by construction of a new dam and replacement pipeline, and removing the primary transmission line from the project since the initial December 24, 1987 application filing date.

Exhibit F Drawing	Drawing No. 1864	Description
BOND FALLS DEVELOPMENT		
Sheet F-1	1008	Main Dam and Auxiliary Dike
Sheet F-2	1009	Plans, Sections, and Details
Sheet F-3	1010	Control Dam and Canal Structures
BERGLAND DEVELOPMENT		
Sheet F-4	1011	General Plan and Elevation
CISCO DEVELOPMENT		
Sheet F-5	1012	Plans, Sections and Details

(3) All of the structures, fixtures, equipment or facilities used to operate or maintain the project, all portable property that may be employed in connection with the project, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) Those sections of Exhibits A, F, and G described above are approved and made part of the license.

(D) The licensee shall file for Commission approval revised Exhibit F Drawings for the Victoria Development, within 90 days after issuance of a new license.

(E) This license is subject to the conditions submitted by the U.S. Department of Agriculture, Forest Service, under Section 4(e) of the FPA, as those conditions are set forth in Appendix A to this order, as modified by the Staff. The Commission reserves the right to amend this license as

[66] By letter dated January 24, 2002, UPPCO reports that during 2001, about 6,050 feet of the 10-foot-diameter woodstave pipeline was replaced with a 9.5-foot-diameter spiral-wound steel pipeline.

appropriate in light of the Forest Service's ultimate disposition of any appeals of, or modifications to, the mandatory Section 4(e) conditions that might arise.

(F) After Commission approval of the filing requirements in Article 301, the licensee shall implement the requirements in license Articles 401, 404, and 406.

(G) This license is subject to the articles set forth in Form L-1 (October 1975), entitled "TERMS AND CONDITIONS OF LICENSE FOR CONSTRUCTED MAJOR PROJECT AFFECTING LANDS OF THE UNITED STATES," and the following additional articles.

Article 201. The licensee shall pay the United States an annual charge, effective as of the date of commencement of project construction, for the purpose of:

(A) Reimbursing the United States for the cost of administering Part I of the Federal Power Act, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The authorized installed capacity for that purpose is 12,000 kilowatts.

(B) Recompensating the United States for use, occupancy and enjoyment of 73.5 acres of lands other than for transmission line right-of-way.

Article 202. Within 45 days of the date of issuance of the license, the licensee shall file three sets of aperture cards of the approved exhibit drawings. The set of originals shall be reproduced on silver or gelatin 35mm microfilm. All microfilm shall be mounted on type D (3-1/4' X 7-3/8") aperture cards.

Prior to microfilming, the FERC Drawing Number (1864-1001 through 1864-1018) shall be shown in the margin below the title block of the approved drawing. After mounting, the FERC Drawing Number shall be typed on the upper right corner of each aperture card. Additionally, the Project Number, FERC Exhibit (e.g., F-1, G-1, etc.), Drawing Title, and date of this license shall be typed on the upper left corner of each aperture card.

Two of the sets of aperture cards shall be filed with the Secretary of the Commission, ATTN: OEP/DHAC. The third set of aperture cards shall be filed with the Commission's Chicago Regional Office.

Article 203. The licensee shall clear and keep clear to an adequate width all lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which result from maintenance, operation, or alteration of the project works. All clearing of lands and disposal of unnecessary material shall be done with due diligence to the satisfaction of the authorized representative of the Commission and in accordance with appropriate federal, state, and local statutes and regulations.

Article 204. If the licensee's project is directly benefitted by the construction work of another licensee, a permittee, or of the United States of a storage reservoir or other headwater improvement, the licensee shall reimburse the owner of the headwater improvement for those benefits, at such time as they are assessed. The benefits will be assessed in accordance with Subpart B of the Commission's regulations.

Article 205. Pursuant to Section 10(d) of the Federal Power Act, a specified reasonable rate of return upon the net investment in the project shall be used for determining surplus earnings of the

project for the establishment and maintenance of amortization reserves. The licensee shall set aside in a project amortization reserve account at the end of each fiscal year one-half of the project surplus earnings, if any, in excess of the specified rate of return per annum on the net investment.

To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year, the licensee shall deduct the amount of that deficiency from the amount of any surplus earnings subsequently accumulated, until absorbed. The licensee shall set aside one-half of the remaining surplus earnings, if any, cumulatively computed, in the project amortization reserve account. The licensee shall maintain the amounts established in the project amortization reserve account until further order of the Commission.

The specified reasonable rate of return used in computing amortization reserves shall be calculated annually based on current capital ratios developed from an average of 13 monthly balances of amounts properly included in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rate for such ratios shall be the weighted average cost of long-term debt and preferred stock for the year, and the cost of common equity shall be the interest rate on 10-year government bonds (reported as the Treasury Department's 10-year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Article 301. Within 90 days after the issuance of a new license, the licensee shall submit one copy to the Division of Dam Safety and Inspections - Chicago Regional Engineer and two copies to the Commission (one of these shall be a courtesy copy to the Director, Division of Dam Safety and Inspections), of a report describing the effects of limiting the reservoir drawdowns in accordance with the settlement agreement on overtopping earth embankments and de-icing the spillway gates.

The report shall include a flood routing study that evaluates the ability of the developments to safely pass flows up to the Inflow Design Flood. The frequency that the earth embankments would be overtopped under the historical and limited drawdowns should be compared. If necessary, the report shall include a plan and schedule for performing any remedial measures necessary to ensure the continued safe operation of the developments during high flows. The foundation materials of the embankment subject to overtopping should be assessed for erodibility. Based on the results of the assessment, the dambreak parameters assumed for determining the hazard potential classification of the structures should be verified and, if necessary, additional dambreak analysis performed and submitted to confirm the hazard potential classification.

The licensee shall not implement the drawdown scenario described in the settlement agreement and Article 401, or the operation monitoring plan required in
Article 404 and the reservoir drawdown plan required in Article 406, until the Commission accepts the report and, if necessary, the licensee completes construction of the remedial measures.

Article 401. Upon Commission acceptance of the report required by Article 301, and approval of the plan required in Article 404, the licensee shall operate the water storage developments of the Bond Falls Project within the reservoir elevation limits, and according to the target elevations, described below.

Bond Falls Development – Bond Falls Reservoir (Flowage)

From February 1 through April 30, the licensee shall maintain the Bond Falls Reservoir between elevation limits 1,467.9 to 1,475.9 feet msl (132-140 feet, local datum). From May 1

through January 31, the licensee shall maintain the Bond Falls Reservoir between elevation limits 1,469.9 to 1,475.9 feet msl (134-140 feet, local datum).

In addition, the licensee shall make a good faith effort to operate the Bond Falls Reservoir to meet or exceed the following end-of-month target elevations. Further, the licensee shall maintain the following end-of-month minimum elevations:

	End-of-Month Target Elevation (feet)		End-of-Month Minimum Elevation (feet)	
Month	Local	msl	Local	msl
Jan	136.0	1,471.9	135.0	1,470.9
Feb	134.0	1,469.9	133.0	1,468.9
Mar	132.5	1,468.4	132.0	1,467.9
Apr	136.0	1,471.9	135.0	1,470.9
May	139.0	1,474.9	138.0	1,473.9
June	137.5	1,473.4	137.0	1,472.9
July	136.5	1,472.4	136.0	1,471.9
Aug	135.0	1,470.9	134.5	1,470.4
Sept	135.0	1,470.9	134.5	1,470.4
Oct	138.0	1,473.9	134.0	1,469.9
Nov	138.0	1,473.9	134.0	1,469.9
Dec	137.0	1,472.9	136.0	1,471.9

Victoria Development – Victoria Reservoir

From March 1 through April 15, the licensee may draw down the Victoria Reservoir to a minimum elevation of 899.5 feet msl to accommodate spring runoff. The licensee shall refill the Victoria Reservoir to elevation 906.6 by April 15, in order to operate the Victoria Development in a run-of-river mode during the spring, according to Article 402. From April 16 through February 28/29, the licensee shall operate the Victoria Reservoir between elevations 905.0 to 908.0 feet msl, with the entire range not to be used on a daily basis.

Bergland Development – Lake Gogebic

The licensee shall operate Bergland Dam to maintain Lake Gogebic within the following elevation limits (in feet msl):

	Minimum	Maximum
September 15 to February 28/29	1,293.7	1,295.7
March 1 to March 31	1,293.7	1,294.7
April 1 to April 24 (ice out)	1,293.7	1,296.2
April 25 (ice out) to June 10	1,295.7	1,296.2
June 11 to September 1	1,295.2	1,296.2

The licensee shall delay increasing the Lake Gogebic minimum water level to 1,295.7 feet msl on April 25, if ice cover on Lake Gogebic is sufficient to cause damage to shoreline structures at the higher lake elevation. The licensee shall consult with a designated representative of the Bond Falls Project Implementation Team (Implementation Team) regarding the timing of raising the lake

elevation, and comply with the April 25 minimum elevation as soon practicable thereafter, once ice conditions no longer present a significant risk to shoreline structures.

In addition to the above elevations limits, the licensee shall make a good faith effort to operate Lake Gogebic to meet the following end of month target elevations:

	End of Month Target Elevation (feet msl)
January & February	1,293.9
March	1,294.2
April & May	1,295.9
June through September	1,295.7
October	1,294.7
November & December	1,294.2

Cisco Development – Cisco Chain of Lakes

The licensee shall operate Cisco Dam to maintain Cisco Lake at or above elevation 1,683.0 feet msl, with a target elevation between 1,683.4 to 1,683.9 feet msl.

Water elevations at the Bond Falls Project may be temporarily modified if required by operating emergencies beyond the control of the licensee, or for short periods upon mutual agreement between the licensee, the Michigan Department of Natural Resources (MDNR), and U.S. Fish and Wildlife Service (FWS) and other members of the Implementation Team. If the water elevations are so modified, the licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident, and shall file a report with the Commission explaining the reason(s) for the deviation from the required elevations. The report shall, to the extent possible, identify the cause, severity, and duration of any deviation, and any observed or reported adverse environmental impacts resulting from the deviation. The report shall also include: 1) operational data documenting the occurrence; 2) a description of any corrective measures implemented at the time of occurrence and the measures implemented or proposed to ensure that similar incidents do not recur; and 3) comments or correspondence, if any, received from the resource agencies regarding the incident.

Article 402. The licensee shall release minimum and maximum flows from each of the project developments, as described below, for the protection and enhancement of water quality, fish and wildlife resources, aesthetics, and recreation in the Middle, West, and South Branches of the Ontonagon River, and in Roselawn, Bluff, and Sucker Creeks.
These flows shall be released immediately after the issuance date of the license under the existing project reservoir drawdown operation, providing there is adequate water available in the reservoirs. If there is inadequate water for these releases, the licensee, within 30 days of the issuance date of this license, shall submit a report explaining the inadequate water supply including supporting documentation.

Bond Falls Development – Middle Branch Ontonagon River

The licensee shall release from the Bond Falls Dam, into the Middle Branch of the Ontonagon River, the following minimum flow releases, as measured downstream of the dam:

April	110 cfs
May	100 cfs
June 1 through October 31	80 cfs

November	90 cfs
December 1 through March 31	80 cfs

Bond Falls Development – South Branch Ontonagon River, Roselawn, Bluff, and Sucker Creeks

The licensee shall release from the Bond Falls Control Structure into the Bond Falls Canal, the minimum and maximum flows described below, as measured immediately downstream of the control structure:

	Minimum	Maximum
April 15 through June 15	25 cfs	150 cfs
September 15 through November 15	25 cfs	150 cfs
Balance of the Year	25 cfs	175 cfs

The licensee shall make all flow adjustments in the Bond Falls Canal in single increments during any 24-hour period. The licensee may make flow changes, either increases or decreases, that are less than or equal to 50 cfs in a single adjustment. For flow changes that are greater than 50 cfs, adjustments must be made in two increments: one-third of the total change on the first adjustment (the first 24-hour period), and two-thirds of the total change on the second adjustment (the second 24-hour period).

Victoria Development – West Branch Ontonagon River

The licensee shall operate the Victoria Development in a run-of-river (ROR) mode from April 15 through June 15, for the protection and enhancement of water quality and fisheries resources in the West Branch Ontonagon River. The licensee shall act during this period to maintain a discharge from the Victoria Dam and Powerhouse that, at all times, approximates the sum of the inflows to the Victoria Reservoir.

The licensee shall operate the Victoria Powerhouse, during the period from June 16 through April 14, such that in any day, the minimum flow is not less than 50 percent of the maximum hourly flow recorded on the previous day. The minimum and maximum flows shall be measured using generating unit output converted to discharge, or other appropriate methodology determined in accordance with Article 404. A minimum flow of 200 cfs shall be maintained during emergency generating conditions declared by the licensee, but these emergency conditions may not exceed 5 percent of the time, or 18 days per year. The Michigan Department of Environmental Quality and other members of the Bond Falls Project Implementation Team shall be notified within one working day of the occurrence of an emergency generating condition.

The licensee shall release a minimum flow of 150 cfs from the Victoria Dam into the bypassed river channel from April 15 through June 15, to protect spawning fish in the West Branch of the Ontonagon River. This flow may be modified in accordance with the monitoring provisions of Article 404, or as otherwise agreed to by the Bond Falls Project Implementation Team.

Bergland Development – West Branch Ontonagon River

The licensee shall release from the Bergland Dam into the West Branch of the Ontonagon River the minimum flows described below, as measured immediately downstream of the dam:

	Lake Gogebic Trigger Elevation (ft, msl)	Minimum Flow
Sept. 15 to Apr. 24	> 1,293.9	50 cfs
Sept. 15 to Apr. 24	≤ 1,293.9	30 cfs
Apr. 25 to June 10	> 1,295.9	50 cfs
Apr. 25 to June 10	≤ 1,295.9	30 cfs
June 11 to Sept. 14	> 1,295.4	50 cfs
June 11 to Sept. 14	≤ 1,295.4	30 cfs

To prevent over drafting Lake Gogebic and to prevent flow changes causing lake levels to fluctuate about the trigger elevation, the licensee shall adjust the minimum flow according to the following criteria:

(1) When the Lake Gogebic elevation is above the trigger elevation and declining, the 50-cfs minimum flow will be reduced to 30 cfs when the elevation is 0.1 feet above the trigger elevation.

(2) When the Lake Gogebic elevation is below the trigger elevation and increasing, the 30-cfs minimum flow will be increased to 50 cfs when the elevation is 0.1 feet above the trigger elevation.

Flow releases from the Bond Falls Project developments may be temporarily modified if required by operating emergencies beyond the control of the licensee, and for short periods upon mutual agreement between the licensee, the Michigan Department of Natural Resources (MDNR), U.S. Fish and Wildlife Service (FWS), and other members of the Bond Falls Project Implementation Team (Implementation Team). If the flow releases are so modified, the licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident, and shall file a report with the Commission explaining the reason(s) for the deviation from the required flow releases. The report shall, to the extent possible, identify the cause, severity, and duration of any deviation, and any observed or reported adverse environmental impacts resulting from the deviation. The report shall also include: 1) operational data documenting the occurrence; 2) a description of any corrective measures implemented at the time of occurrence and the measures implemented or proposed to ensure that similar incidents do not recur; and 3) comments or correspondence, if any, received from the resource agencies regarding the incident.

Article 403. When inflows to Victoria Reservoir fall to 250 cfs, during dry water years, the licensee shall consult with the Michigan Department of Natural Resources (MDNR), U.S. Fish and Wildlife Service (FWS), and other members of the Bond Falls Project Implementation Team (Implementation Team), to determine how to maintain a minimum of 200 cfs to the Victoria Powerhouse. The reservoir water level operating requirements of Article 401, and the minimum and maximum flow requirements of Article 402, may be adjusted, as agreed upon by the Implementation Team, in the following order of priority, upon approval of the plan required in Article 404:

(1) Bond Falls Flowage elevations;

(2) Bond Falls Canal flows;

(3) Victoria bypassed reach minimum flow;

(4) Lake Gogebic elevations and outflows;

(5) Middle Branch minimum flows; and

(6) Cisco Lake elevations and outflows.

The 200-cfs emergency-generating-condition minimum flow from the Victoria Development may be reduced or discontinued, when all of the following conditions are met:

Condition	April - September	October - March
Bond Falls Flowage elevation	1,461.9 ft. msl (126.0 ft. local)	1,461.9 ft. msl (126.0 ft. local)
Lake Gogebic elevation	1,295.0 ft. msl	1,293.7 ft. msl
Middle Branch flow	40 cfs	40 cfs
Cisco Lake elevation	1,683.4 ft. msl	1,683.0 ft. msl

Any adjustments to the Cisco Lake elevation shall be made prior to the formation of ice cover on the lake. Consultations between the licensee and the Implementation Team shall occur on at least a weekly basis during dry water year conditions, as defined by this article, and shall continue until the dry water year conditions have abated, and the requirements of Articles 401 and 402 have been restored.

Article 404. The licensee shall file for Commission approval, within 60 days of the date that the Commission has verified that the licensee has met the requirements of Article 301, a plan to monitor project operations as required by Articles 401 and 402. The plan shall be prepared in consultation with the Michigan Department of Natural Resources, U.S. Fish and Wildlife Service (FWS), and the other members of the Bond Falls Project Implementation Team (Implementation Team), and include a minimum of three years of monitoring reservoir elevations and discharges from each of the Project developments, in order to determine whether these elevations and discharges can be attained without affecting project operations, and to demonstrate whether gate openings, headwater elevations, verified rating curves, and power production can be used to verify compliance. At the conclusion of the three-year monitoring period, the licensee shall consult with the Implementation Team to determine if project operations should be modified. Following this consultation, the licensee shall file a report with the Commission, describing the results of the monitoring, and any recommended modifications to project operations. The monitoring plan shall include the following:

(1) Description of the methodology for providing flow data for Middle Branch minimum flows and Bond Falls Canal flows using a combination of recorded gate openings, headwater elevations and verified gate rating curves that are developed by the licensee in consultation with the Michigan Department of Natural Resources and the other members of the Implementation Team. This methodology must be equivalent to methods used by the U.S. Geological Survey (USGS) and must provide data of approximately the same quality to those of the USGS.

(2) Provisions for the licensee to record gate openings each time a gate is changed.

(3) Provisions for the licensee to continuously monitor (e.g., hourly measurement) the Bond Falls Flowage and Victoria Reservoir headwater elevations.

(4) Provision to provide the Team with a table of discharges for each dam, at each gate opening and headwater elevation, for the easy interpretation of compliance data.

(5) Description of the methodology to provide USGS-equivalent data for all other sites, including the Victoria Development bypassed reach, Victoria Powerhouse tailwater, Lake Gogebic, Cisco Lake, and Cisco Branch of the Ontonagon River.

(6) Provisions for the licensee to contract with USGS to verify gate openings, headwater elevations and gate rating curves at the Bond Falls Project semi-annually, or at a frequency recommended by USGS for the initial three-year period after license issuance. If USGS is unavailable, then an equivalent contractor can be used in consultation with the Implementation Team.

(7) The frequency of data recording for all sites, and format of compliance reports following the recommendations of the Implementation Team.

(8) Provisions to provide compliance reports required by the Commission to the Implementation Team for project operations review.

As part of the monitoring program, the licensee shall continue its existing level of cooperation with the USGS and shall fund 80% of the cost of the following gages, for the term of the license: Lake Gogebic near Bergland, USGS No. 04035995 (lake level monitoring gage); West Branch of the Ontonagon River near Bergland, USGS No. 04036000; Cisco Lake near Watersmeet, USGS No. 04037400 (lake level monitoring gage); and Cisco Branch Ontonagon River at Cisco Lake outlet, USGS No. 04037500.

The licensee shall also provide 80 percent of the funding for the following existing USGS gauges, for no more than three years following the date of issuance of this license, to determine if compliance data measured at the Bond Falls dam are accurate. Funding shall be discontinued if accuracy is demonstrated. The affected gages are: Bond Falls Canal near Paulding, USGS No. 04033500; and Middle Branch Ontonagon River near Trout Creek, USGS No. 04034500.

At the same time, the licensee may discontinue funding the following USGS gages in the Ontonagon River watershed: Middle Branch Ontonagon River near Rockland, USGS No. 04035500; and Ontonagon River near Rockland, USGS No. 04040000.

The licensee shall include with the operations monitoring plan an implementation schedule, documentation of consultation, copies of agency comments and recommendations on the draft plan, and specific descriptions of how the agencies' comments are accommodated by the final plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The operations monitoring plan shall not be implemented until the licensee is notified that the plan is approved. Upon Commission approval, the licensee shall implement the plan according to the approved schedule, including any changes required by the Commission.

Article 405. The licensee shall install a downstream fish protection device at the Victoria Dam by year 10 of the issuance date of a new license, in consultation with the Michigan Department of Natural Resources (MDNR), U.S. Fish and Wildlife Service (FWS), and the other members of the Bond Falls Project Implementation Team (Implementation Team). The Implementation Team shall develop the fish protection device selection process and the final installation schedule. The licensee shall contribute the equivalent of the cost of in-kind replacement of the existing Victoria Dam

trashracks, when such replacement is deemed necessary. Any additional costs for a fish protection device shall be borne by the Mitigation Enhancement Fund (see Section 7 of the Settlement).

Fish protection effectiveness studies shall be funded by the Mitigation Enhancement Fund, if such studies are deemed necessary by the Implementation Team. If studies are deemed necessary, then the licensee shall develop a study plan and implementation schedule in consultation with the Implementation Team, and file the plan for Commission approval. The licensee shall include with the filing, documentation of consultation, copies of agency comments and recommendations on the draft study plan, and specific descriptions of how the agencies' comments are accommodated by the final study plan. The licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the study plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the study plan. No ground-disturbing or land-clearing activities for installing a fish protection device shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the study plan, including any changes required by the Commission.

Article 406. The licensee shall file for Commission approval, within 60 days of the date that the Commission has verified that the licensee has met the requirements of Article 301, a Reservoir Drawdown Plan. The purpose of the Plan is to minimize the impact of reservoir drawdowns on aquatic and riparian resources in any of the project reservoirs. The Plan shall be developed in consultation with the Michigan Department of Natural Resources (MDNR), U.S. Fish and Wildlife Service (FWS), and the other members of the Bond Falls Project Implementation Team (Implementation Team), and shall include notification procedures for drawdowns, drawdown and refill rates, procedures to prevent fish stranding, and any other operational modifications that may be required to protect riparian resources. The Plan shall require notification for all planned drawdowns prior to initiation of the drawdown or operational change. Notification for unplanned drawdowns or changes should occur as soon as practicable after the change, generally within one working day.

The licensee shall include documentation of consultation, copies of agency comments and recommendations on the draft Plan, and specific descriptions of how the agencies' comments are accommodated by the Plan. The licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the Plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the Plan. The Reservoir Drawdown Plan shall not be implemented until the licensee is notified that the Plan is approved. Upon Commission approval, the licensee shall implement the Plan, including any changes required by the Commission, provided the drawdown scenario required in Article 301 has been filed with and approved by the Commission.

Article 407. Within six months after the issuance of a new license, the licensee shall file with the Commission, for approval, a Cisco Dam Operation Plan. The purpose of the Plan is to minimize flow fluctuations in the Cisco Branch and to minimize water level fluctuation in Cisco Lake. The licensee shall develop the Plan in consultation with the Michigan Department of Natural Resources (MDNR), U.S. Fish and Wildlife Service (FWS), and the other members of the Bond Falls Project Implementation Team (Implementation Team).

The licensee shall consult with the Implementation Team prior to filing the Plan with the Commission. The Plan shall include an implementation schedule, documentation of consultation, copies of comments and recommendations on the draft Plan, and specific descriptions of how agency comments are accommodated by the Plan. The licensee shall allow a minimum of 30 days for the Implementation Team members to comment and to make recommendations, before filing the Plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the Plan. The Cisco Dam Operation Plan shall not be implemented until the licensee is notified that the Plan is approved. Upon Commission approval, the licensee shall implement the Plan according to the approved schedule, including any changes required by the Commission.

Article 408. The licensee shall maintain water quality standards, for the protection and enhancement of aquatic resources in the Ontonagon River. The licensee shall not discharge water from the Bond Falls Project developments into the riverine reaches of the Ontonagon River that exceed the following temperature limits (Fahrenheit):

	Victoria, Bergland and Cisco Dams	Victoria Powerhouse and Bond Falls Dams
January	38	38
February	38	38
March	41	43
April	56	54
May	70	65
June	80	68
July	83	68
August	81	68
September	74	63
October	64	56
November	49	48
December	39	40

In addition, the licensee shall not cause the dissolved oxygen concentration in the Cisco and West Branches of the Ontonagon River downstream of the Cisco, Bergland and Victoria dams, and the Victoria Powerhouse, to be less than 5 mg/l. The licensee shall not cause the dissolved oxygen concentration measured in the Middle Branch of the Ontonagon River and in Roselawn Creek downstream of the Bond Falls Dams to be less than 7 mg/l.

In the event that these water temperature and dissolved oxygen limits are not met, the licensee shall notify the Surface Water Quality Division of the Michigan Department of Environmental Quality within one working day, and take all reasonable steps necessary to ensure that compliance with the water quality limits are achieved, consistent with the water quality mitigation requirements of Article 409.

Article 409. Within six months after the issuance of a new license, the licensee shall file for Commission approval, a Water Quality Monitoring Plan, to document compliance with the water quality requirements of Article 408. The monitoring plan shall include a three-year monitoring period for dissolved oxygen and temperature, provisions for subsequent monitoring based upon the results of the initial three-year monitoring period, and provisions for mitigation as described herein. All water quality monitoring shall be funded by the Mitigation Enhancement Fund described in Settlement

Condition 7. If the fund is exhausted, the licensee shall fund the remaining activities as determined in the Water Quality Monitoring Plan.

The licensee shall consult with the Michigan Department of Environmental Quality (MDEQ), and other members of the Bond Falls Project Implementation Team (Implementation Team), prior to filing the Plan with the Commission. Monitoring locations downstream of each of the project discharges shall be determined in consultation with the MDEQ and other Implementation Team members. These monitoring locations shall be in areas of complete mixing. The licensee shall include with the Plan an implementation schedule, documentation of consultation, copies of agency comments and recommendations on the draft Plan, and specific descriptions of how the comments are accommodated by the Plan. The licensee shall allow a minimum of 30 days for agency comments and recommendations before filing the Plan with the Commission. If the licensee does not adopt a specific recommendation, the filing shall include the licensee's reasons, based on project-specific information.

In the event that monitoring studies demonstrate that the water quality limits of Article 408 are exceeded, the licensee shall first implement operational measures to improve water quality, such as spilling a portion of required flow releases from applicable facilities. The licensee shall bear the cost of any operational measures to improve water quality. Least cost structural solutions shall be the next preferred option. Required structural mitigation shall be funded by the Mitigation Enhancement Fund until the Fund is exhausted, upon which the licensee shall fund the remaining amount. All water quality mitigative measures shall be developed and implemented in consultation with the MDEQ and other members of the Implementation Team.

Plans for structural modifications to improve water quality shall be filed with the Commission for approval, prior to construction of any such modifications. These plans must be developed in consultation with the MDEQ and other members of the Implementation Team, and must include design drawings and estimated construction and operations costs for any structural modifications, a schedule for constructing the modifications, documentation of consultation, copies of agency comments and recommendations on the structural modifications, and specific descriptions of how agency comments were addressed.

The Commission reserves the right to require changes to the Water Quality Monitoring Plan and any planned structural modifications. The Water Quality Monitoring Plan shall not be implemented until the licensee is notified that the Plan is approved. Further, no ground-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the structural modification plan is approved. Upon Commission approval, the licensee shall implement the Water Quality Monitoring Plan and any necessary structural modifications according to the approved schedule, including any changes required by the Commission.

Article 410. Within one year after the issuance of a new license, the licensee shall file with the Commission, for approval, an Erosion and Sediment Control Plan. The licensee shall be fully responsible for funding and implementing appropriate shoreline protection and erosion control measures at all licensee-owned project facilities and recreation sites, and future construction activities related to project structures. The licensee shall be responsible for certain erosion problems on non-licensee-owned lands directly related to project operation, or other erosion problems requiring protection and control, as determined by the Bond Falls Project Implementation Team (Implementation Team). The Plan shall identify lands to be covered with implementation of the Plan, and shall include, but not be limited to, the following provisions:

(1) the final Plan shall be based on site specific conditions and shall include

(a) descriptions of actual site conditions, (b) detailed descriptions of final preventive measures, (c) detailed descriptions, design drawings, and topographic locations of final control measures, including rip-rap placement, stream set back and stabilization of spoil material, and class of rock to be used, (d) detailed descriptions and locations of actual Best Management Practices (BMP's) to be used, (e) a specific implementation schedule; and (f) provisions for an erosion control monitor;

(2) a provision to use a sediment pond or sediment filter bags during impoundment construction to prevent fine sediments generated from blasting from being transported downstream; and

(3) the final Plan shall include a revegetation plan that includes a complete prescription for revegetating all disturbed areas, including: (a) locations of treatment areas, (b) plant species and methods to be used, (c) planting densities,
(d) fertilizer formulations, (e) seed test results, (f) application rates, (g) locations and density of any plantings, and (h) a specific implementation schedule.

The licensee shall prepare the Plan after consultation with the U.S. Fish and Wildlife Service, U.S. Forest Service, Michigan Department of Natural Resources, Michigan Department of Environmental Quality, the Wisconsin Department of Natural Resources, other members of the Implementation Team, and other entities, including private property owners, to minimize the adverse effects of shoreline erosion, to include, but not limited to, the north shore of Lake Gogebic. The licensee shall include with the Plan documentation of consultation, copies of comments and recommendations on the completed Plan after it has been prepared and provided to the agencies and other entities, and specific descriptions of how the agencies' and other entities' comments are accommodated by the Plan. The licensee shall allow a minimum of 30 days for the agencies and other entities to comment and to make recommendations before filing the Plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the Plan. No ground-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the Plan, including any changes required by the Commission.

Article 411. Within six months after the issuance of a new license, the licensee shall file for Commission approval, a Nuisance Plant Control Plan for the four project impoundments. Implementation of the Plan shall be funded by the Mitigation Enhancement Fund described in Section 7 of the Settlement.

The licensee shall consult with the Michigan Department of Natural Resources, U.S. Fish and Wildlife Service, and other members of the Bond Falls Project Implementation Team (Implementation Plan), prior to filing the Plan with the Commission. The Plan shall include an implementation schedule, documentation of agency consultation, copies of agency comments and recommendations, and specific descriptions of how the agency comments are accommodated by the Plan. The licensee shall allow a minimum of 30 days for the Team to comment and to make recommendations, before filing the Plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the Plan. The Nuisance Plant Control Plan shall not be implemented until the licensee is notified that the Plan is approved. Upon

Commission approval, the licensee shall implement the Plan according to the approved schedule, including any changes required by the Commission.

Article 412. Within six months after the issuance of a new license, the licensee shall file for Commission approval, a Woody Debris Transport and Management Plan for the four project developments. The Plan shall provide for the reasonable transport of vegetative material over the project dams. The estimated amount of vegetative material that would be passed, and the procedures for passing vegetative material, shall be included in the Plan.

The licensee shall consult with the Michigan Department of Natural Resources, U.S. Fish and Wildlife Service, and other members of the Bond Falls Project Implementation Team (Implementation Team), prior to filing the Plan with the Commission. The Plan shall include an implementation schedule, documentation of agency consultation, copies of agency comments and recommendations, and specific descriptions of how the agency comments are accommodated by the Plan. The licensee shall allow a minimum of 30 days for the Team to comment and to make recommendations, before filing the Plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the Plan. The Woody Debris Transport and Management Plan shall not be implemented until the licensee is notified that the Plan is approved. Upon Commission approval, the licensee shall implement the Plan according to the approved schedule, including any changes required by the Commission.

Article 413. Within twelve months after the issuance of a new license, the licensee shall file for Commission approval, a Buffer Zone Plan for all lands that are owned by the licensee and located within the Project boundary. The Plan shall include a variable width buffer zone with an average width of 200 feet, adjacent to the Project impoundments. The principal management objective for the buffer zone is to achieve old growth forest characteristics. The Plan shall also be consistent with the Threatened and Endangered Species Protection and Enhancement Plan described in Article 415.

The licensee shall consult with the U.S. Forest Service and other members of the Bond Falls Project Implementation Team (Implementation Plan) prior to filing the Plan with the Commission. The Plan shall include an implementation schedule, documentation of agency consultation, copies of agency comments and recommendations, and specific descriptions of how the agency comments are accommodated by the Plan. The licensee shall allow a minimum of 30 days for the Team to comment and to make recommendations before filing the Plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the Plan. The Buffer Zone Plan shall not be implemented until the licensee is notified that the Plan is approved. Upon Commission approval, the licensee shall implement the Plan according to the approved schedule, including any changes required by the Commission.

Article 414. Within twelve months after the issuance of a new license, the licensee shall file with the Commission, for approval, a Wildlife and Land Management Plan (Plan) for project lands. The Plan must be consistent with the Buffer Zone Plan described in Article 413, the Threatened and Endangered Species Protection and Enhancement Plan described in Article 415, as well as with specific measures implemented under the Mitigation and Enhancement Fund described in Section 7 of the Settlement. The Plan shall include, but not be limited to, the following provisions and specific measures:

(1) Use of the State of Michigan Best Management Practices for timber management within the Bond Falls Project boundaries, to the extent practicable.

(2) Measures for the protection and enhancement of common loon, including: limiting camping to designated locations on Bond Falls Project lands for the purpose of enhancing loon nesting potential; providing information to campers regarding islands not open to camping; promptly reporting known camping violations to the local law enforcement personnel; providing information, including signage, to campers and boaters regarding the protection of nesting loons, and penalties for disturbing and harassing loons; development of contour maps for Bond Falls Flowage and the Victoria Reservoir for siting of loon nesting structures; and the provision of two loon nesting structures on Bond Falls Flowage and one nesting structure on Victoria Reservoir.

(3) Consistency with U.S. Forest Service osprey management guidelines along with any future Wisconsin Department of Natural Resources or Michigan Department of Natural Resources osprey management guidelines, and installation of one osprey nesting platform on the Bond Falls Flowage, Lake Gogebic, and Victoria Reservoir.

(4) Use of native seed, to the extent practicable, in revegetation efforts.

(5) The restoration and enhancement of wild rice in Bond Falls Flowage, Cisco Lake, Lake Gogebic, and Victoria Reservoir, to the extent that restoration and enhancement are determined by the Bond Falls Project Implementation Team (Implementation Team) to be feasible and desirable.

(6) Annual consultations with the resource agencies on: the status of wildlife populations within the project boundaries; measures to protect and enhance wildlife populations; planned timber harvest; and other land management issues that may impact wildlife populations. The meetings should be scheduled to occur not later than 45 days after the resource agencies have received updated information from the annual bald eagle nest surveys. The meetings should address, among other issues, the implementation of the threatened and endangered species management guidelines during the following year.

The licensee shall implement any direct measures identified by the Plan, or the annual review, that the Implementation Team determines to be appropriate, for the study, mitigation, or enhancement of fish and wildlife resources. All direct measures identified through the Plan shall be funded by the Mitigation Enhancement Fund.

The licensee shall consult with the resource agencies, and other members of the Team, prior to filing the plan with the Commission. The Plan shall include an implementation schedule, documentation of agency consultation, copies of agency comments and recommendations, and specific descriptions of how the agency comments are accommodated by the Plan. The licensee shall allow a minimum of 30 days for the Parties to comment and to make recommendations before filing the Plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the Plan. No ground-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan according to the approved schedule, including any changes required by the Commission.

Article 415. Within twelve months after the issuance of a new license, the licensee shall file with the Commission, for approval, a Threatened and Endangered Species Protection and Enhancement Plan (Plan) for all project lands. The Plan shall be consistent with the Buffer Zone Plan described in Article 413, as well as with specific measures implemented under the Mitigation and Enhancement Fund described in Section 7 of the Settlement. The Plan shall include, but not be limited to, the following provisions and specific measures:

(1) Protection of threatened and endangered species from timber harvesting, and associated activities, on project lands.

(2) Consistency with U.S. Fish and Wildlife Service (FWS), U.S. Forest Service (USFS), and Wisconsin Department of Natural Resources (WDNR) bald eagle management guidelines, along with any future Michigan Department of Natural Resources (MDNR) bald eagle management guidelines, as appropriate.

(3) Reimbursement of either MDNR or WDNR, as determined by the Implementation Team, for up to 50 percent of the costs of annual airplane flights to identify the location of bald eagle nests in the project area.

(4) Consistency with the MDNR wolf management guidelines and the Ottawa National Forest Land Management Plan guidelines for the protection of gray wolf den sites, and with any future FWS or WDNR wolf management guidelines, as appropriate, including consultation with the resource agencies on the construction of new roads on licensee-owned project lands.

(5) Annual consultations with the resource agencies on: the status of threatened and endangered species populations within the project boundaries; measures to protect and enhance threatened and endangered species populations; planned timber harvest; and land management issues that may impact threatened and endangered species. The meetings should be scheduled to occur not later than 45 days after the resource agencies have received updated information from the annual bald eagle nest surveys. The meetings should address, among other issues, the implementation of the threatened and endangered species management guidelines during the following year.

The licensee shall implement any direct measures identified by the Plan, or the annual review, that the Bond Falls Project Implementation Team (Implementation Team) determines to be appropriate, for the study, protection, or enhancement of threatened and endangered species. All direct measures identified through the Plan shall be funded by the Mitigation Enhancement Fund described in Section 7 of the Settlement.

The licensee shall consult with the resource agencies, and other members of the Implementation Team, prior to filing the Plan with the Commission. The Plan shall include an implementation schedule, documentation of agency consultation, copies of agency comments and recommendations, and specific descriptions of how the agency comments are accommodated by the Plan. The licensee shall allow a minimum of 30 days for the Parties to comment and to make recommendations before filing the Plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the Plan. The Plan shall not be implemented until the licensee is notified that the Plan is approved. Upon Commission approval, the

licensee shall implement the Plan according to the approved schedule, including any changes required by the Commission.

Article 416. Within twelve months after license issuance, the licensee shall file with the Commission for approval, a Recreation Plan (Plan), for implementing all recreational enhancements at the Bond Falls Project. This Plan shall be consistent with the Buffer Zone Plan described in Article 413 and the Threatened and Endangered Species Protection and Enhancement Plan described in Article 415. The licensee shall prepare the Plan in consultation with the Bond Falls Project Implementation Team (Implementation Team), and shall implement the Plan after approval by the Commission. The Plan shall provide full access to licensee-owned facilities.

The Plan shall provide for the following recreational enhancements at the project:

(1) One accessible boat launching facility on the Victoria Reservoir. This facility shall include a 18-foot-wide concrete ramp, a skid pier, proper parking with designated sites near the ramp, signage, hardened paths and a vault toilet.

(2) A shoreline fishing access area adjacent to the boat launch on the Victoria Reservoir. This facility shall include five accessible fishing flatouts with connecting trails and picnic tables.

(3) Walk-in access to the tailwater of the Victoria Powerhouse. This shall include an access trail, stairs and a vault toilet.

(4) A marked canoe portage route with put-in and take-out sites at the Victoria Development.

(5) Designation and maintenance of the existing dispersed boat-in campsites on the Victoria Reservoir, with no restroom facilities, trash receptacles or other high-maintenance facilities to be provided at these campsites.

(6) An accessible tailwater fishing and canoe launching area at the Bergland Dam. This facility shall include an accessible trail, parking, vault toilet, and a canoe put-in or take-out area. In addition, two flatouts for accessible fishing shall be developed at Lake Gogebic; one adjacent to Bergland Dam and one in the Bergland Dam tailwater.

(7) One accessible boat launching facility on the Bond Falls Flowage. This shall include an 18-foot-wide concrete ramp, a skid pier, proper parking with designated sites, signage, hardened paths and a vault toilet or equivalent. Other existing gravel boat launching ramps shall be maintained in good condition, using the same or similar materials as currently exists at these sites.

(8) Continued operation of existing campgrounds at the Bond Falls Development, except as may be required for wildlife enhancement plans, including threatened and endangered species.

(9) Designation and development of dispersed camping sites at the Bond Falls Development on selected islands in Bond Falls Flowage, with no restroom facilities, trash receptacles or other high-maintenance facilities to be provided at these campsites. Camping on Bond Falls Flowage shall be limited to formal campgrounds or designated dispersed sites only.

(10) Maintenance of a canoe portage route, with take-out facility, at the Bond Falls Dam.

(11) Provision of a toll-free telephone number with information on projected flow releases from Bond Falls Project developments, and river flow information for the West Branch, Cisco Branch, South Branch, and Middle Branch of the Ontonagon River.

The Plan shall include, at a minimum, the following: (1) final site plans for the recreational facilities described above; (2) design drawings of the directional signs to the project recreational facilities, and a description of where they will be located;
(3) erosion and sediment control measures required in article 410, which shall be implemented during construction, and which shall minimize destruction of the area's natural vegetation, and provide for revegetation, stabilization, and landscaping of new construction areas and slopes damaged by erosion; and (4) an implementation schedule.

The licensee shall prepare the Plan after consultation with the Implementation Team. The licensee shall include with the Plan, documentation of agency consultation, copies of agency comments and recommendations on the draft Plan, and specific descriptions of how the agencies' comments are accommodated by the Plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the Plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the Plan. No ground disturbing or land-clearing activities for new recreational facilities shall begin until the licensee is notified that the Plan is approved. Upon approval, the licensee shall implement the Plan, including any changes required by the Commission.

Article 417. The licensee shall establish a Bond Falls Project Implementation Team (Implementation Team), to provide for the coordination and implementation of the measures required by this license. The Implementation Team shall consist of a single official designate from: the licensee, Michigan Department of Natural Resources (MDNR), Wisconsin Department of Natural Resources (WDNR), U.S. Fish and Wildlife Service (FWS), U.S. Forest Service (USFS), and the Keweenaw Bay Indian Community (KBIC), plus ex-officio advisory members. The Michigan Hydro Relicensing Coalition (MHRC) shall be an ex-officio advisory member of the Implementation Team. The licensee's designate will serve as Implementation Team Chair, and all Implementation Team members, once designated, shall remain as members, unless notification is made as to a successor, in writing, to all Implementation Team members and to the Director, Division of Hydropower Administration and Compliance (DHAC), 7 days prior to the date the change becomes effective.

The Implementation Team shall, at a minimum, have one annual meeting to review activities for the preceding year, but other meetings may be scheduled, as required, to provide for ongoing coordination and implementation of required measures. All meetings must be noticed at least 14 days in advance, and all official and ex-officio members of the Implementation Team must be notified. Notice of annual meetings must also be made to the DHAC and to the Surface Water Quality Division of the Michigan Department of Environmental Quality (MDEQ). Other Implementation Team meetings shall be held, if requested in writing to the Implementation Team Chair, by a minimum of two members of the Implementation Team. The Implementation Team, at its option, may invite any individual or organizational representative to any of its meetings, to serve in an ex-officio advisory capacity. The Implementation Team may also form ad hoc teams or committees that include other employees, interested parties, contractors, or consultants, to assist in the implementation or monitoring of measures required by the license. For Implementation Team meetings, a quorum to conduct business at a duly noticed Implementation Team meeting shall consist of any four of the five Team members (MDNR, WDNR, FWS, USFS, KBIC), plus the licensee's representative

(Implementation Team Chair). All Implementation Team decisions shall be made by consensus vote of the Implementation Team members in attendance, but unanimous approval of the decision is not required. If one or more member, however, opposes a proposed decision, there is no consensus. The Implementation Team must periodically report to all interested parties and to the DHAC, regarding the actions taken and progress made in implementing the measures required by the license. At a minimum, the licensee shall prepare and file an annual report with the Commission, but additional reports may be prepared as determined by the Implementation Team.

All other actions of the Implementation Team, related to communications and correspondence, report reviews and consultations, concurrence or non-concurrence with reports or submittals, and dispute resolution, shall follow the procedures outlined in the Settlement Agreement.

Article 418. Authority is reserved by the Commission to require the licensee to construct, operate, and maintain, or to provide for the construction, operation, and maintenance of, such fishways as may be prescribed during the term of the license by the Secretary of the Interior under Section 18 of the Federal Power Act.

Article 419. The licensee shall implement the "Programmatic Agreement Among the Federal Energy Regulatory Commission, the Advisory Council on Historic Preservation, the State of Wisconsin, State Historic Preservation Officer, and the State of Michigan, State Historic Preservation Officer, For Managing Historic Properties That May Be Affected By New and Amended Licenses Issuing For the Continued Operation of Existing Hydroelectric Projects in the State of Wisconsin and Adjacent Portions of the State of Wisconsin," executed on December 30, 1993, including but not limited to the Historic Resources Management Plan (HRMP) for the project. In the event that the Programmatic Agreement is terminated, the licensee shall implement the provisions of its approved HRMP. The Commission reserves the authority to require changes to the HRMP at any time during the term of the license. If the Programmatic Agreement is terminated prior to Commission approval of the HRMP, the licensee shall obtain approval from the Commission before engaging in any ground disturbing activities or taking any other action that may affect any historic properties within the Bond Falls Project's area of potential effect.

Article 420. The licensee shall comply with the procedural requirements found in Section 9.3 (Dispute Resolution) of the Settlement Offer filed July 11, 2000.

Article 421. The licensee shall comply with all Commission regulations regarding any potential sale of the project, transfer of the license, surrender of the license, or application for new license, and shall keep the members of the Bond Falls Project Implementation Team fully informed of its future plans for the project. The licensee shall also establish a “Responsibility Fund,” which will consist of two contributions of $50,000 to an interest-bearing fund, on the twentieth and thirtieth anniversaries of the new license (total contribution of $100,000), for use in complying with applicable Commission regulations at the end of the license period, or to finance any requirements related to license surrender. The Fund shall become a project asset and will remain with the project in the event the license is transferred.

Article 422. (a) In accordance with the provisions of this article, the licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee shall also have continuing responsibility to supervise and control the use and occupancies for which it grants

permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article.

If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and water for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 watercraft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement.

To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee shall: (1) inspect the site of the proposed construction; (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site; and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of, project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than January 31 of each year, the licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project

overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved Exhibit R or approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year.

At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must submit a letter to the Director, Office of Energy Projects, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G or K map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) before conveying the interest, the licensee shall consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer;

(2) before conveying the interest, the licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved Exhibit R or approved report on recreational resources of an Exhibit E; or, if the project does not have an approved Exhibit R or approved report on recreational resources, that the lands to be conveyed do not have recreational value;

(3) the instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee shall take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and
(iii) the grantee shall not unduly restrict public access to project waters; and

(4) the Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G or K drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised Exhibit G or K drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

(H) The licensee shall serve copies of any Commission filing required by this order on any entity specified in this order to be consulted on matters related to the filing. Proof of service on these entities must accompany the filing with the Commission.

(I) This order is issued under authority delegated to the Director and is final unless a request for rehearing is filed within 30 days from the date of its issuance, as provided in Section 313 of the FPA. The filing of a request for rehearing does not operate as a stay of the effective date of this license or of any other date specified in this order, except as specifically ordered by the Commission. The licensee's failure to file a request for rehearing of this order shall constitute acceptance of this license.

J. Mark Robinson
Director
Office of Energy Projects

Appendix A.

**Final Terms and Conditions for License
Necessary for the Protection and Utilization of the Ottawa National Forest**

in Conjunction with the Application for License for FERC Project No. 1864, Bond Falls (Upper Peninsula Power Co.).

Submitted by: USDA Forest Service, Eastern Region, Milwaukee, Wisconsin, 53203. Randy Moore, Regional Forester. (414) 297-3170.
August, 2002

1 General

The Forest Service provides the following final 4(e) conditions for the Bond Falls Hydroelectric Project, FERC No. 1864. In accordance with 18 CFR 4.34(b)(1)(i), the Forest Service is providing these final conditions pending the outcome of any administrative appeals or litigation. These conditions reflect terms of the Settlement Agreement (June, 2000). License articles contained in the Commission's Standard Form L-5, issued by Order No. 540, dated October 31, 1972 (revised October 1975), cover general requirements that the Secretary of Agriculture, acting by and through the Forest Service, considers necessary for the adequate protection and utilization of the land and resources of the Ottawa National Forest. For the purposes of Section 4(e) of the Federal Power Act (16 USC 797(e)), the purposes for which the National Forest System Lands were created or acquired shall be the protection and utilization of those resources enumerated in the Organic Administration Act of 1897 (30 Stat. 11), the Multiple Use/Sustained Yield Act of 1960 (90 Stat. 2949), the National Forest Management Act of 1976 (90 Stat. 2949), and any other law specifically establishing a unit of the National Forest System or prescribing the management thereof (such as the Wilderness Act or the Wild and Scenic Rivers Act), as such laws may be amended from time to time, and as implemented by regulations and approved Forest Plans, prepared in accordance with the National Forest Management Act. Therefore, pursuant to Section 4(e) of the Federal Power Act, the following conditions covering specific requirements for the protection and utilization of National Forest System lands shall also be included in any license issued.

1.1 Abbreviations and Definitions

1.1.1 Abbreviations

ADA	- Americans with Disabilities Act
C	- Degrees Centigrade
CFS	- Cubic Feet per Second
CFR	- Code of Federal Regulations
CPI	- Consumer Price Index
CZM (P)	- Coastal Zone Management (Program)
DO	- Dissolved Oxygen
DOI	- U.S. Department of the Interior
DLC	- Division of Licensing and Compliance
EPA	- U.S. Environmental Protection Agency
F	- Degrees Fahrenheit
FERC	- Federal Energy Regulatory Commission
FPA	- Federal Power Act
FWS	- United States Department of Interior–Fish and Wildlife Service
KBIC	- Keweenaw Bay Indian Community
MDEQ	- Michigan Department of Environmental Quality

MDNR - Michigan Department of Natural Resources
mg/kg - Milligrams per Kilogram
mg/l - Milligrams per Liter
MHRC - Michigan Hydro Relicensing Coalition
MPSC - Michigan Public Service Commission
MSL - Mean Sea Level
NGO - Non-Governmental Organization
NGVD - National Geodetic Vertical Datum
O&M - Operations and Maintenance
ROR - Run-of-River
SWQD - Surface Water Quality Division
T/E/S - Threatened/Endangered/Sensitive
UPPCO- Upper Peninsula Power Company
USFS - United States Department of Agriculture–Forest Service
USGS - United States Geological Survey
WDNR - Wisconsin Department of Natural Resources

1.1.2 Definitions

"**Day**" is defined, for operational purposes, as a 24-hour period, midnight to midnight.
"Ex officio advisory member" is defined as an organization that participates in the settlement implementation process but does not have voting rights.
"Licensee" is Upper Peninsula Power Company (**UPPCO**).
"Maximum flow" is defined as the highest hourly flow for the day.
"Michigan Hydro Relicensing Coalition" is a coalition of Michigan conservation organizations that include the Anglers of the Au Sable, Michigan United Conservation Clubs, Michigan Council of Trout Unlimited and Great Lakes Council of the Federation of Fly Fishers.
"Minimum flow" is defined as the lowest allowable hourly flow at any facility.
"Parties" is defined to be Upper Peninsula Power Company, United States Department of the Interior-Fish and Wildlife Service, United States Department of Agriculture-Forest Service, Michigan Department of Natural Resources, Michigan Department of Environmental Quality, Michigan Department of Attorney General, Wisconsin Department of Natural Resources, Keweenaw Bay Indian Community, the Michigan Hydro Relicensing Coalition, American Rivers and American Whitewater Affiliation.
"Project" is the Bond Falls Hydroelectric Project (FERC Project No. 1864), which includes four dams, covered under this Settlement. The dams are Bond Falls Dam, Cisco Dam, Bergland Dam and Victoria Dam.
"Resource Agencies" are the Wisconsin Department of Natural Resources, Michigan Department of Natural Resources, Michigan Department of Environmental Quality, United States Department of Interior–Fish and Wildlife Service, Keweenaw Bay Indian Community, and United States Department of Agriculture–Forest Service.
"Riparian Lands" are lands adjacent to a watercourse.
"**Section 18 of the Federal Power Act"** is the section of the Federal Power Act that refers to the reservation of authority to the Secretary of the Department of the Interior to prescribe fishways.
"Settlement" or "Settlement Agreement" is defined as the Bond Falls Settlement Agreement.
"Team" is the Settlement Implementation Team as provided for in Section 9 including representatives of UPPCO, MDNR, WDNR, FWS, USFS, KBIC and ex officio advisory members.
"Upper Peninsula Power Company" or **"UPPCO"** means the company, its subsidiary and any affiliated companies and/or parent.

2.0 Standard Forest Service Provisions

2.1 Condition No. 1 – Modification of USDA Forest Service Conditions as a Result of Agency Administrative Appeals Process

Upon completion of the USDA Forest Service administrative appeals process at 36 Code of Federal Regulations (CFR) Part 215 or litigation, the Chief of the USDA Forest Service or the Secretary of Agriculture may direct that the terms and conditions submitted herein be modified. Therefore, the USDA Forest Service reserves the right to modify the terms and conditions submitted herein if so directed.

2.2 Condition No. 2 - Compliance with USDA Regulations and Other Laws

The Licensee shall comply with the regulations of the Department of Agriculture and all Federal, State, county, and municipal laws, ordinances, or regulations in regard to the area or operations covered by this license, to the extent federal law does not preempt ordinances or regulations.

2.3 Condition No. 3 - Habitat and Ground-Disturbing Activities on National Forest System Lands

The Licensee shall prepare site-specific plans, in consultation with USDA Forest Service, for all habitat and ground-disturbing activities on National Forest System Lands. The Licensee shall comply with USDA Forest Service sensitive species and integrated weed management guidelines and protocols in developing and executing such plans. The Licensee shall not file any such plans with the Commission or commence any such activities without approval from the USDA Forest Service.

2.4 Condition No. 4 - Changes to As-Licensed Project Works and Operations on National Forest System Lands

The Licensee shall consult with the USDA Forest Service regarding any proposed changes to as-licensed project works or operations on National Forest System Lands. The Licensee shall not commence or implement any changes to as-licensed project works or operations on National Forest System Lands without approval from the USDA Forest Service.

3.0 Additional Provisions

3.1 Condition No. 5 - Instream Flow Requirements

3.1.1 Bond Falls Dam and Flowage

3.1.1.1 *Middle Branch Minimum Flow Releases* [Section deleted]

3.1.1.2 *Bond Falls Canal Operation* [Section deleted]

3.1.2 Victoria Dam Operations

3.1.2.1 *Bypassed Channel Minimum Flow Release* [Section deleted]

3.1.3 Lake Gogebic and Bergland Dam Operations

3.1.3.1 *Minimum Flows* [Section deleted]

3.1.3.2 *Minimum Flow Trigger Conditions* [Section deleted]

3.1.3.3 *Lake Gogebic Dry Water Years Consultation* [Section deleted]

3.1.4 *Emergencies Beyond UPPCO's Control* [Section deleted]

3.1.5 System Operation in Dry Water Years [Section deleted]

3.2 Condition No. 6 - Guaranteed Priority Flow Bypass Device and Gauging

3.2.1 Operation Compliance Plan [Section deleted in part; provisions included as to Bond Falls Flowage only]

- Provisions to record gate opening changes will be recorded by UPPCO each time a gate is changed.
- Provisions to continuously monitor Bond Falls Flowage and Victoria Reservoir headwater elevations.
- Provision to provide the Team a table of discharges for each dam at each gate opening and headwater elevation for the easy interpretation of compliance data.
- A three year test period to determine if UPPCO can demonstrate compliance using gate openings, headwater elevations, verified rating curves and power production.
- Provisions for UPPCO to contract with USGS to verify gate openings, headwater elevations and gate rating curves at Bond Falls semi-annually or at a frequency recommended by USGS for the initial three year period after license issuance. If USGS is unavailable, then an equivalent contractor can be used in consultation with the Team.
- The frequency of data recording for all sites and format of compliance reports following the recommendations of the Team.
- Provisions to provide compliance reports required by the FERC to the Team for project operations review.

3.2.2 USGS Gauging Stations

3.2.2.1 *USGS Gauging Station Funding* [Section deleted]

3.2.2.2 *Discontinued USGS Gauging Stations* [Section deleted]

3.3 Condition No. 7 – Fish Screens and Passage Structures

3.3.1.1 *Upstream Fish Passage Funding* [Section deleted]

3.3.2 Downstream Fish Protection

3.3.2.1 *Schedule* [Section deleted]

3.3.2.2 *Funding* [Section deleted]

3.4 Condition No. 8 – Fish and Wildlife Mitigation Plan

3.4.1 Nuisance Plant Control [Section included as to Bond Falls Flowage only]

UPPCO shall, after consultation with the Team, file within 6 months of licensure for the FERC approval a nuisance plant plan for all four UPPCO impoundment. Funding for the implementation of this plan shall be from the Mitigation Enhancement Fund (Condition No. 15).

3.4.2 Woody Debris Transport and Management [Section included as to Bond Falls Flowage only]

UPPCO shall, after consultation with the Team, file within 6 months of licensure for the FERC approval a wood debris transport and management plan for all four UPPCO dams. The plan shall provide for the reasonable transport of vegetative material over the project dams. The extent of vegetative material that would be passed and the procedures for passing vegetative material shall be included in the plan and will depend on dam configuration, downstream hazards, cost of handling and ability of the downstream reach to transport the debris.

3.4.3 Wild Rice Restoration [Section included as to Bond Falls Flowage only]

The Team shall consider the restoration and enhancement of wild rice in Bond Falls Flowage, Cisco Lake, Lake Gogebic and Victoria Reservoir. If wild rice restoration and enhancement is determined to be feasible and desirable, it shall be funded by the Mitigation Enhancement Fund (Condition 14).

3.4.4 Wildlife Protection and Enhancement

3.4.4.1 *Project Lands* [Section included as Bond Falls Development only]

All lands currently included within the Bond Falls Project boundaries shall remain within the project boundaries under the new license. The existing project boundaries, as so modified, are deemed to be sufficient for all regulatory purposes, and UPPCO shall have no obligation to expand the project boundaries beyond those previously established in the current FERC license. Use and occupancy of UPPCO lands within the Bond Falls Project area and project waters shall conform to the appropriate standard FERC land use license article.

3.4.4.2 *Buffer Zone* [Section deleted]

3.4.4.3 *Wildlife and Land Management Plan* [Section deleted]

3.5 Condition No. 9 – Threatened, Endangered, and Sensitive Species Plan

3.5.1 Project Land Management [Section included as to Bond Falls Development only]

Project lands shall be managed in accordance with appropriate threatened, endangered, and sensitive species management guidelines as detailed below.

3.5.2 Annual Meetings Regarding Threatened, Endangered and Sensitive Species [Section included as to Bond Falls Development only]

Annual meetings shall be held by the Team to discuss land management issues that may impact threatened, endangered and sensitive species management. The meetings will be scheduled to occur not later than 45 days after the Resource Agencies have received updated information from the annual bald eagle nest surveys. The meetings will address implementation of the threatened and endangered species management guidelines during the following year.

3.5.3 Funding [Section deleted]

3.5.4 Bald Eagle Protection and Management

3.5.4.1 *Wildlife and Land Management Plan Consistency* [Section included as to Bond Falls Development only]

UPPCO's Wildlife and Land Management Plan shall follow Federal and State bald eagle management guidelines. Direct measures determined by the Team to be necessary to implement the bald eagle management guidelines shall be funded by the Mitigation Enhancement Fund (Condition No. 15).

3.5.4.2 *Flight Reimbursement* [Section included as to Bond Falls Development only]
MDNR or WDNR, as appropriate, shall at the discretion of the Team be reimbursed for flight time over the project boundary for the purpose of identifying bald eagle nest locations up to 50 percent of the total costs per year. Bald eagle flights and signage for eagles shall be funded by the Mitigation Enhancement Fund (Condition No. 15).

3.5.5 *Gray Wolf Protection and Management* [Section included as to Bond Falls Development only]
UPPCO's Wildlife and Land Management Plan shall be consistent with the MDNR wolf management guidelines and the Ottawa National Forest Land Management Plan guidelines for the protection of gray wolf den sites, along with any future USFWS or WDNR guidelines, as appropriate. UPPCO shall discuss with the Team any planned construction of new roads on UPPCO-owned project lands. Direct measures determined by the Team to be necessary to implement the gray wolf management guidelines shall be funded by the Mitigation Enhancement Fund (Condition No. 15).

3.5.6 Common Loon Protection and Mitigation

3.5.6.1 *Common Loon Habitat Protection* [Section included as to Bond Falls Development only]
UPPCO's land management plan shall limit camping to UPPCO designated locations on Bond Falls Project lands for enhancing loon nesting potential. UPPCO shall provide information to campers regarding islands not open to camping and promptly report known violation to the local law enforcement personnel**.** Boaters and campers shall be informed (through signage or other means) of laws and regulations related to protecting loons.

3.5.6.2 *Common Loon Habitat Enhancement* [Section included as to Bond Falls Development only]
Contour maps shall be developed for Bond Falls Flowage and Victoria Reservoir to provide for the proper siting of the loon nesting structures and to provide information to support other aspects of the Settlement Agreement. Two common loon nesting structures shall be installed on Bond Falls Flowage and one loon nesting structure shall be installed on Victoria Reservoir.

3.5.6.3 *Funding* [Section deleted]

3.5.7 Osprey Protection and Management

3.5.7.1 *Wildlife and Land Management Plan Consistency* [Section included as to Bond Falls Development only]
UPPCO's Wildlife and Land Management Plan shall be consistent with USFS osprey management guidelines along with any future WDNR or MDNR osprey management guidelines.

3.5.7.2 *Osprey Habitat Enhancement* [Section included as to Bond Falls Development only]
One osprey nesting platform shall be constructed on each of Bond Falls Flowage, Lake Gogebic and Victoria Reservoir using Mitigation Enhancement Fund monies (Condition No. 15).

3.5.7.3 *Funding* [Section deleted]

3.6 Condition No. 10 – Erosion Control Measures Plan [Section deleted except the first sentence]
UPPCO shall be responsible for developing and implementing soil erosion control plans and measures for future construction activities related to project structures.

3.7 Condition No. 11 – Cultural Resources Protection

3.7.1 Responsibility [Section included as to Bond Falls Development only]

UPPCO shall be responsible for compliance with Section 106 of the National Historic Preservation Act , including all State Historic Preservation Officer requirements.

3.8 Condition No. 12 – Recreation Plan

3.8.1 Site Operation [Section deleted]

3.8.2 Accessibility Plan [Section deleted]

3.8.3 Recreation Site Enhancements

3.8.3.1 Victoria Impoundment and Tailwater

3.8.3.1.1 *Impoundment Boat Launch* [Section deleted]

3.8.3.1.2 *Shoreline Fishing Access* [Section deleted]

3.8.3.1.3 *Tailwater Fishing Access* [Section deleted]

3.8.3.1.4 *Canoe Portage* [Section deleted]

3.8.3.1.5 *Dispersed Camping* [Section deleted]

3.8.3.2 *Cisco Dam and Cisco Chain of Lakes* [Section deleted]

3.8.3.3 *Bergland Dam Tailwater* [Section deleted]

3.8.3.3.1 *Tailwater Fishing and Boating Access* [Section deleted]

3.8.3.4 *Bond Falls Flowage*

3.8.3.4.1 *Impoundment Boat Launches*

One accessible impoundment boat launching facility shall be developed at Bond Falls Flowage, including an 18-foot-wide concrete ramp, a skid pier, proper parking with designated sites, signage, hardened paths and a vault toilet or equivalent. Other gravel boat launching ramps will be maintained in good condition using the same or similar materials as currently exist at these sites.

3.8.3.4.2 *Campgrounds*

Current campgrounds shall continue to be operated, except as may be required for wildlife enhancement plans including threatened and endangered species.

3.8.3.4.3 *Dispersed Camping*

Designated dispersed camping sites shall be marked and developed on selected islands in Bond Falls Flowage. No restroom facilities, trash receptacles or other high-maintenance facilities shall be provided on the islands. Camping at Bond Falls Flowage shall be limited to formal campgrounds or designated dispersed sites only.

3.8.3.4.4 ***Canoe Portage***
A canoe portage route with take-out facility will be maintained.

3.8.4 Funding

3.8.4.1 ***Capital Funding*** **[Section deleted]**

3.8.4.2 ***Operation and Maintenance Funding*** **[Section included as to Bond Falls only]**
UPPCO shall fund the operation and maintenance of all required recreation sites at Bond Falls Flowage and tailwater, Victoria Reservoir and tailwater and Lake Gogebic tailwater. The Mitigation Enhancement Fund may not be used for this purpose.

3.9 Condition No. 13 – Storage Reservoir Operation Plan

3.9.1 Bond Falls Dam and Flowage

3.9.1.1. ***Bond Falls Flowage Target Elevations***
During normal project operation, UPPCO will make a good faith effort to meet or exceed the following end-of-month target elevations (local datum) at Bond Falls Flowage:

January	136.0 feet
February	134.0 feet
March	132.5 feet
April	136.0 feet
May	139.0 feet
June	137.5 feet
July	136.5 feet
August	135.0 feet
September	135.0 feet
October	138.0 feet
November	138.0 feet
December	137.0 feet

3.9.1.2 ***Bond Falls Flowage Minimum End-of-Month Headwater Elevations***
UPPCO shall maintain the following minimum end-of-month elevations at Bond Falls Flowage except during dry water years as defined in Condition No. 5 above:

January	135.0 feet
February	133.0 feet
March	132.0 feet
April	135.0 feet
May	138.0 feet
June	137.0 feet
July	136.0 feet
August	134.5 feet
September	134.5 feet
October	134.0 feet
November	134.0 feet
December	136.0 feet

The first three (3) years of the license term shall serve as a trial period to determine whether these target elevations can be attained without unduly affecting project operations. After the first three

years, the USDA Forest Service as a part of the Team will assess the viability of these target elevations. Changes to the operating criteria may be made with the agreement of the Team.

3.9.1.3 ***Winter Bond Falls Flowage Elevations***
UPPCO shall maintain the Bond Falls Flowage elevation between 132 and 140 feet local datum (1,467.9 to 1,475.9 feet mean sea level [MSL]) from February 1 through April 30.

3.9.1.4 ***Open Water Season Bond Falls Flowage Elevations***
UPPCO shall maintain the Bond Falls Flowage elevation between 134 and 140 feet local datum (1,469.9 to 1,475.9 feet MSL) from May 1 through January 31.

3.9.2 Victoria Dam and Impoundment

3.9.2.1 ***Impoundment Elevation Limits*** **[Section deleted]**

3.9.2.2 ***Spring Impoundment Elevation Limits*** **[Section deleted]**

3.9.2.3 ***Spring Powerplant Operation*** **[Section deleted]**

3.9.2.4 ***Powerplant Operation During Other Times of the Year*** **[Section deleted]**

3.9.2.5 ***Emergency Operation*** **[Section deleted]**

3.9.3 Lake Gogebic and Bergland Dam

3.9.3.1 ***Reservoir Elevation Limits*** **[Section deleted]**

3.9.3.2 ***Lake Gogebic Target Elevations*** **[Section deleted]**

3.9.4 Cisco Dam and the Cisco Chain of Lakes

3.9.4.1 ***Lake Elevation Limits*** **[Section deleted]**

3.9.4.2 ***Cisco Dam Operation*** **[Section deleted]**

3.9.4.3 ***Cisco Dam Ownership and Operation Under Any New Owner*** **[Section deleted]**

3.9.5 Emergencies Beyond UPPCO's Control [Section deleted]

3.10 Condition No. 14 – Water Quality

3.10.1 Water Quality

3.10.1.2 ***Water Temperature Limits-General*** **[Section deleted]**

3.10.1.3 ***Water Quality Measurement Locations*** **[Section deleted]**

3.10.1.4 ***Dissolved Oxygen Limits*** **[Section deleted]**

3.10.1.5 ***Deviation from Water Quality Limits*** **[Section deleted]**

3.10.1.6 *Water Quality Mitigation* [Section deleted]

3.10.1.6.1 *Mitigation Responsibility* [Section deleted]

3.10.1.6.2 *Current Mitigation* [Section deleted]

3.10.1.6.3 *Water Quality Mitigative Solutions* [Section deleted]

3.10.1.6.4 *Water Quality Jurisdictional Statement* [Section deleted]

3.10.1.7 *Water Quality Monitoring Plan* [Section deleted]

3.11 Condition No. 15 – Mitigation and Enhancement Fund

3.11.1 General Concept [Section deleted]

3.11.2 Fund Administration [Section deleted]

3.11.3 Funding [Section deleted]

3.11.4 Mitigation Fund Items [Section deleted]

3.11.5 Items Outside of the Mitigation Enhancement Fund [Section deleted]

3.12 Condition No. 16 – Future Dam Responsibility

3.12.1 Scope of Responsibility [Section deleted]

3.12.2 Project Disposal [Section deleted]

3.12.2.1 *License Transfer* [Section deleted]

3.12.3 Application for Surrender [Section deleted]

3.12.4 Responsibility Fund [Section deleted]

3.12.5 Future Relicensing [Section deleted]

3.13 Condition No. 17 – Implementation and Oversight

3.13.1 Project Coordination

3.13.1.1 *Team Responsibility and Composition* [Section deleted]

3.13.1.2 *Ex officio Advisory Membership and Meeting Notification* [Section deleted]

3.13.1.3 *Annual Meetings* [Section deleted]

3.13.1.4 *Annual Meeting Notification* [Section deleted]

3.13.1.5 *Team Communications and Ad Hoc Teams* [Section deleted]

3.13.2 Review, Consultation and Concurrence of Settlement Submissions

3.13.2.1 *Communications and Correspondence* [Section deleted]

3.13.2.2 *Reviews* [Section deleted]

3.13.2.3 *Review Consultation* [Section deleted]

3.13.2.4 *Non-concurrence* [Section deleted]

3.13.2.5 *Concurrence* [Section deleted]

3.13.3 *Dispute Resolution* [Section deleted]

3.13.3.1 *Arbitration/Facilitation* [Section deleted]

3.13.3.2 *Final Resolution* [Section deleted]

Table 1. *Mitigation and Enhancement Fund Schedule* [Table deleted]