

**Comprehensive Fisheries Survey of Grand Rapids Flowage,
Marinette County Wisconsin during 2003-2004**

Waterbody Identification Code 610700



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February 2006

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EXECUTIVE SUMMARY

A comprehensive fisheries survey of Grand Rapids Flowage on the Menominee River was conducted during the 2003 and 2004 field seasons. The dominant gamefish species in the flowage were smallmouth bass (population estimate = 5.5 fish per acre), northern pike (population estimate = 0.95 fish per acre), and walleye. Black crappie, bluegill, pumpkinseed, yellow perch, rock bass, yellow and black bullhead and white sucker are common fish species in this flowage. Lake sturgeon are also present in the flowage, but very common in the river upstream from the flowage. I recommend managing this flowage for smallmouth bass, northern pike, walleye and panfish.

Lake and location:

Grand Rapids Flowage, Marinette County, T34N R23E Sec 32

Located in southeast Marinette County, it is an impoundment of the Menominee River and a boundary water with the State of Michigan.

Physical/ Chemical attributes (Carlson, Andrews, and Threinen 1975):

Morphometry: 259 acres, maximum depth 21 feet.

Lake type: Impoundment (1912).

Watershed: 3,762 square miles: including 22 acres of adjoining wetlands.

Basic water chemistry: hard water drainage with slightly alkaline. Light brown water of moderate transparency. Secchi disk reading of 9 feet, PH 7.1, Conductance 222 umhos.

Littoral substrate: 85 percent sand and 15 percent silt.

Aquatic vegetation: Abundant (emergent (rush spp) and submergent) although not pervasive in main channel because of riverine habitat. Eurasian milfoil is present in this flowage.

Other features: The reservoir has extensive shallow areas and numerous stumps. The reservoir has a storage volume of 1,443 acre feet and a storage ratio of .47 (storage volume divided by mean flow – 3,074 cfs). Using the mean flow, the turnover rate of flowage is 57 hours (Kornely 1991). The dam is regulated through a hydroelectric license issued by the Federal Energy Regulatory Commission to Wisconsin Public Service Corporation. The Grand Rapids Dam is one of ten dams on the Menominee River (see Appendix).

Purpose of the Surveys: Assess fishery status.

Dates of fieldwork: Mini-fyke juvenile fish netting August 7, 2003.

Electroshocking: October 1, 2003 and June 10, 2004 (mini-boom).

Fyke netting (all species) April 13-22, 2004.

BACKGROUND

Grand Rapids Flowage was created between 1910 and 1912 when the Menominee and Marinette Light and Traction Company built the dam and powerhouse. The Grand Rapids dam and hydroelectric facility is currently owned and operated by Wisconsin Public Service Corporation (WPS) and is licensed by the Federal Energy Regulatory Commission. The current license expires in 2027. The power company owns all riparian land within the flowage boundaries and no residences exist along the flowage. A boat landing each on the Michigan and Wisconsin sides of the impoundment are maintained by WPS. The next dam is located 26 miles upstream and five additional boat landings are located within that segment of the Menominee river. The operation of this facility does impact the fishery resource. The presence of the dam impedes upstream and downstream fish migration, impinges and entrains many fish through the turbine operation and otherwise alters the morphology of the river channel.

Current information indicates that lake sturgeon are the only species stocked upstream of flowage. Approximately 10,000 small fingerlings (1-3") were stocked in 2003 and 2,000 small fingerlings in 2005. Fish stocking of other species has not occurred within or upstream of this flowage. Previous fish surveys of this flowage have occurred in 1964, 1982 and 1989. Some of the results from those surveys are referenced in this report.

METHODS

Four mini-fyke nets (1/4" stretch mesh with turtle exclusion) were lifted on August 7, 2003. A WDNR standard direct current electrofishing boat was utilized on October 1, 2003 along 3.2 miles of shoreline. Eight standard fyke nets (3/4" stretch mesh) were lifted daily from April 13-22, 2004. A small mini-boom shocking boat was deployed for an abbreviated survey on June 10, 2004. The two electroshocking surveys aren't comparable because of different equipment, time of year, time of day, and 2 netters versus 1 netter in June of 2004.

Length to nearest tenth of an inch was recorded for all fish. In the mini-fyke surveys, the first 30 fish for each species was measured then a total count recorded. Game fish were given a left ventral clip during the standard fyke net surveys for use in mark and recapture population estimates. Age structures (scales and spines) were removed from 5 gamefish and 10 panfish per species, per half inch group. Ages were determined according to standard WDNR procedures. Length at age comparisons are for all lakes sampled for those species in the northeast Wisconsin and were last updated in 2003.

RESULTS AND DISCUSSION

Catch per unit effort results are depicted in Table 1 and respective analysis for each major species is written below. No further analysis is presented for the following species: yellow bullhead, black bullhead, white sucker, common carp, bowfin, and lake sturgeon. Although, a summary paragraph for these species is included at the end of this report.

Table 1. Catch per unit effort of gamefish and panfish species during comprehensive fish surveys in 2003-04 of Grand Rapids Flowage, Marinette County Wisconsin. Netting catch rates are reported as number of fish per net day, while shocking catch rates are number of fish per mile of shoreline. Panfish data were not collected during all sampling events.

Species	August 2003 mini-fyke	October 2003 shocking	April 2004 fyke netting	June 2004 mini boom shocking
Smallmouth bass	4.0	10.6	27.9	4.8
Northern pike	2.0	12.5	14.1	1.3
Walleye	0	17.8	5.9	1.1
Largemouth bass	5.0	2.8	0	0
Black crappie	2.0	1.6	7.3	0
Bluegill	23.0	1.6	1.0	0
Pumpkinseed	2.0	1.9	2.7	0
Rock bass	1.0	9.4	3.0	0
Yellow perch	5.0	8.8	11.5	0
Yellow bullhead	10.0	0.6	17.3	0
Black bullhead	966.0	2.5	171.2	0
Lake sturgeon	0	0.6	0	0
White sucker	1.0	3.1	19.4	0
Bowfin	0	0	15.0	0

Smallmouth and Largemouth Bass

During 2003 mini-fyke netting, juvenile smallmouth bass were captured as 4 fish per net day. Electroshocking produced 10.6 fish per mile in 2003 and 4.8 in 2004. Fyke nets lifted in April of 2004 produced 224 smallmouth bass (14 were recaptures) or 27.9 fish per net day. The 2004 adult smallmouth bass population is estimated at 1,435 with a 95% confidence limit of 848 to 2,375. The 11 and 13 inch size groups were the prominent size groups in 2003, while the 15-17 inch groups composed most of the fish in 2004 (Figure 1). The length at age of smallmouth bass sampled in 2004 met or exceeded the northeast Wisconsin average for the first 7 years (Table 2). Eleven percent of the aged small mouth bass were older than 11 years. Growth rates for 3 to 8 year old bass sampled during a 1989 survey were slightly higher than the 2004 survey, although sample size was less for most age classes. Low numbers of largemouth bass were caught in 2003-04, but natural reproduction was evident as juveniles were caught with mini-fyke nets. In 1989, few adult largemouth bass were observed and no juveniles were reported in the survey.

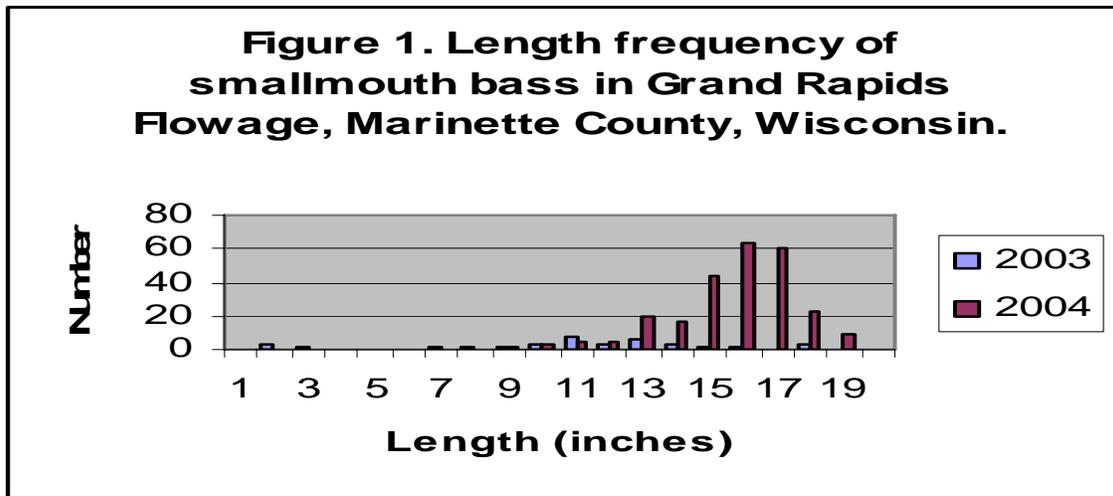


Table 2. 2004 Age- length distribution of smallmouth bass from Grand Rapids Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age and 1989 survey information. N equals sample size.

Age	3	4	5	6	7	8	9	10	11	12	13	14	15	16
NER Average	9.9	12.3	14.2	15.8	17.1	18.5	18.6	19.9	-	-	-	-	-	-
2004 Grand Rapids	11.5	13.2	14.2	15.9	17.3	17.4	18.7	18.5	-	19.1	19.6	20.2	-	20.7
2004 (N)	5	13	21	10	20	13	6	1	-	4	3	2	-	2
1989 survey	12.9	14.4	16.0	16.7	17.9	18.5	-	-	-	-	-	-	-	-
1989 (N)	38	8	12	7	1	1								

Walleye

During 2003 mini-fyke netting, juvenile walleye were not captured. Electroshocking produced 17.8 fish per mile in 2003 and 1.1 fish per mile in 2004. Fyke nets lifted in April of 2004 produced 48 walleye (2 were recaptures) or 5.9 fish per net day. Only 17 walleyes, ranging from 7.0 to 25.4 inches, were captured in 1989. Walleye likely move upstream into the river for spawning and are underrepresented in spring surveys. A walleye population estimate could not be calculated in 2003 or 2004. In 2003, juvenile walleye (5-10 inches) dominated the sample. In 2004, most of the walleye were 15 to 18 inches in length (Figure 2). The length at age of walleye sampled in 2003-04 only exceeded the state average for years 8 and 9, but there was one fish per age class (Table 3). Only 5 walleye were aged from the 1989 survey and that analysis revealed one II year old was 11.8 inches, three III year olds ranged from 12.3-17.7 inches, and one 25.2 inch walleye was XI years old.

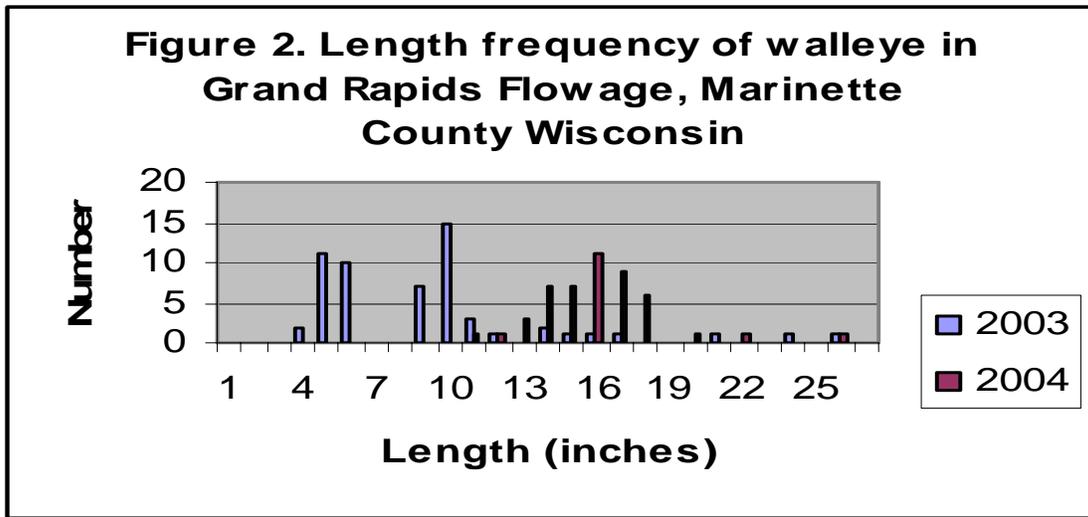


Table 3. 2003-04 Age- length distribution of walleye from Grand Rapids Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data. N equals sample size.

Age	2	3	4	5	6	7	8	9	10	11	12
NER Average	10.8	13.6	16.0	17.7	19.0	21.5	22.6	24.1	-	-	27.0
Grand Rapids	10.1	12.9	14.9	17.1	17.5	18.7	24.5	26.2	-	-	26.3
N	5	4	13	19	2	6	1	1	-	-	1

Northern Pike

During mini-fyke netting, juvenile northern pike were captured as 2 per net day. Electroshocking produced 12.5 fish per mile in 2003 and 1.3 in 2004. Fyke nets lifted in April of 2004 produced 140 northern pike (29 were recaptures) or 14.1 fish per net day. The 2004 adult northern pike population is estimated at 246 with a 95% confidence limit of 173 to 349. The 2004 population estimate equates to 0.95 fish per acre compared to 3.7 pike per acre estimate for 1989. In 2004, the 16 to 23 inch size groups were the prominent size groups and composed 79% of the pike sampled (Figure 3). The length at age of northern pike sampled in 2004 was less than similar data for the northeast Wisconsin averages (Table 4). Pike were also smaller for most age classes when compared to 1989 data.

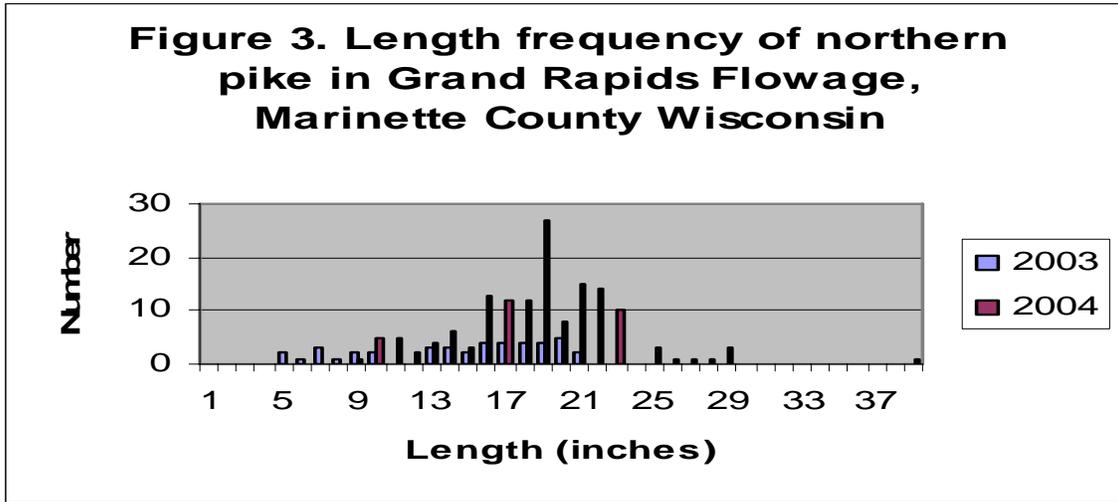


Table 4. 2004 Age- length distribution of northern pike from Grand Rapids Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age and 1989 survey information. N equals sample size.

Age	1	2	3	4	5	6	7	8
NER Average	11.4	15.3	18.4	21.5	24.4	27.4	30.0	30.9
2004 Grand Rapids	11.1	13.7	18.1	20.2	22.9	26.6	39.0	30.0
2004 (N)	4	23	28	31	15	3	1	1
1989 survey	12.0	16.9	19.0	23.1	24.3	29.9	29.4	-
1989 (N)	12	21	35	16	7	2	1	-

Panfish

Juvenile black bullhead were the most abundant panfish caught in 2003 at 966 fish per net day followed by bluegill (23), yellow bullhead (10) and yellow perch (5). The 2003 electrofishing survey revealed a good population of yellow perch (17.8 fish per mile) and rock bass (9.4), compared to less numbers of pumpkinseed (1.9), black crappie (1.6) and bluegill (1.6). However, fyke net surveys indicated higher numbers of adult black bullhead (171.2 fish per net day), yellow bullhead (17.3), yellow perch (11.5 fish per net

day) and black crappie (7.3) compared to rock bass (3) pumpkinseed (2.7) and bluegill (1.0). During the 1989 survey, panfish species captured in order of decreasing abundance were bullhead sp., yellow perch, pumpkinseed, rock bass, black crappie, and bluegill.

The 2003 survey revealed low numbers of black crappie from several inch groups. In 2004, the black crappie 7-10 inch groups were prominent in the survey (Figure 4). In 1989, 55 black crappie were sampled in the 4.7 to 11.6 size range compared to 29 captured in 2003-04. In 2003, yellow perch were present in low numbers for all size groups (2-9 inches) (Figure 5). In 2004, moderate numbers of 6 to 9 inch perch were present in the survey, but the 10 inch size group was the largest group. More yellow perch (196) were sampled during the 1989 survey and their size range was 5.1 to 12.2 inches. The size range for 16 pumpkinseed caught in 2003-04 was 3-6 inches compared to 3-7 inch size groups for 196 caught in 1989. The size range for 37 rock bass sampled in 2003-04 was compared to 3-9 inch size groups for 88 fish caught in 1989. Growth, as indicated by age length, distribution from sub-sampled black crappie, bluegill, and yellow perch were all better than the northeast Wisconsin average for those respective panfish species (Tables 5-7).

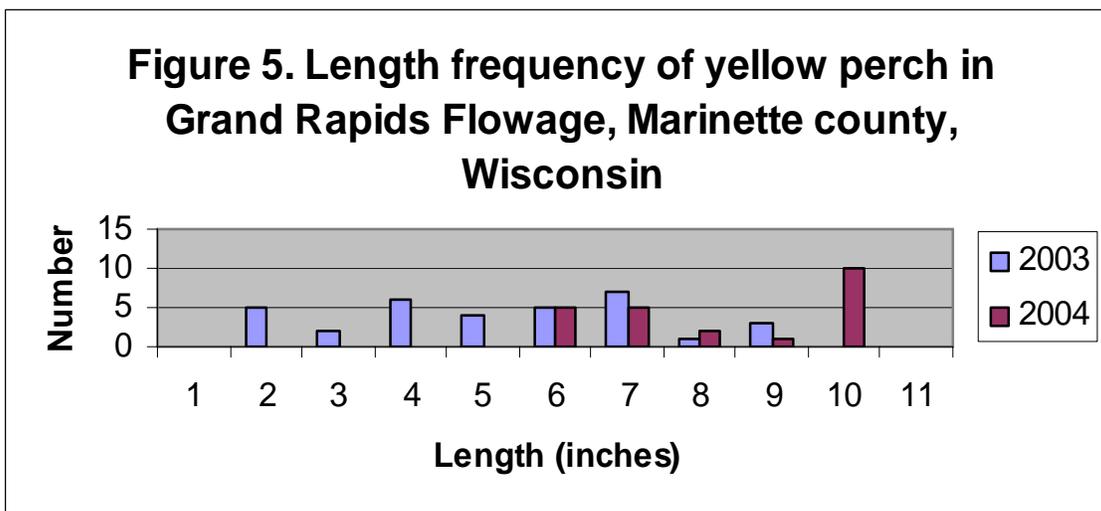
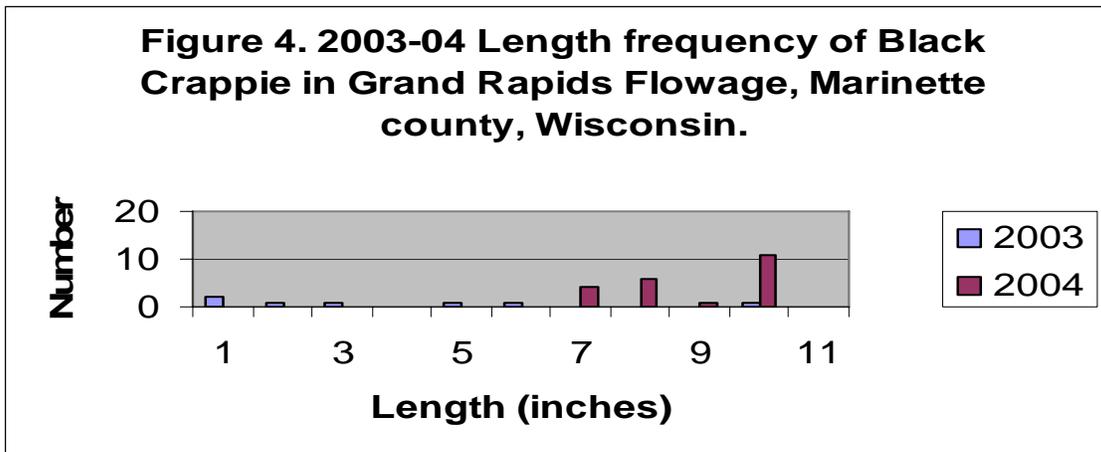


Table 5. 2003-04 Age- length distribution of black crappie from Grand Rapids Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data. N equals sample size.

Age	2	3	4	5	6	7
NER Average	5.4	7.2	8.6	9.6	10.4	11.2
Grand Rapids	6.0	7.6	9.1	11.4	12.4	12.4
N	3	26	22	11	4	4

Table 6. 2003-04 Age- length distribution of bluegill from Grand Rapids Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data. N equals sample size.

Age	2	3	4	5	6
NER Average	4.0	4.8	5.8	6.6	7.2
Grand Rapids	4.5	7.5	7.0	7.6	8.4
N	1	1	6	2	3

Table 7. 2003-04 Age- length distribution of yellow perch from Grand Rapids Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data. N equals sample size.

Age	2	3	4	5	6	7
NER Average	5.5	6.7	7.6	8.4	8.9	10.2
Grand Rapids	6.3	7.2	9.0	9.6	10.9	11.7
N	1	38	43	9	4	5

Other fish species

Other species caught during the 2003-04 surveys included redhorse sp., white sucker, carp, bowfin, burbot and lake sturgeon. These species were also present in 1989. Adult carp were common during 2003-04 and 1989 surveys. Two lake sturgeon, 21.3 and 23.0 inches, were caught without retention of an aging structure. Lake sturgeon weren't captured in 1989.

CONCLUSIONS AND RECOMMENDATIONS

Grand Rapids Flowage supports a very good fishery and natural reproduction of all species is present. The smallmouth bass population is exceptional as reflected by the large numbers caught and robust numbers of large, adult fish. A minimum size limit of 14 inches has maintained this excellent size structure of the population, despite increased fishing pressure. Northern pike are also an important species in this flowage and a very good size distribution was evident during surveys, despite a decreased adult population from 969 fish in 1989 to 246 in 2004. The 2003-04 fishery surveys revealed limited numbers of walleye, but the numbers and size of fish observed is comparable the fishery seen in 1989.

The existing fishery is very good and no stocking is needed to enhance the populations of various species. The excellent smallmouth bass fishery is particularly targeted by

fishermen. The present fishing regulations are maintaining a good quality fishery and no changes are needed at this time (Table 7).

The hydroelectric company, Wisconsin Public Service, has operated this dam as run of river since 1997 and provides stable flows through the flowage. Wisconsin Public Service also owns the entire shoreline zone, so the shoreline should be maintained in a natural state and no development is anticipated in the coming years. The power company maintains two boat launches in the flowage and those facilities are adequate.

The agencies should meet with the power company to facilitate a fish passage plan and associated structures around Grand Rapids. Those developments should be a major priority of the power company and resource agencies to allow relatively free movement around this dam. Especially since fish passage plans are being developed for the dams downstream and upstream of Grand Rapids.

Table 7. 2005 Grand Rapids Flowage Fishing Regulations for selected species, Marinette County Wisconsin.

Species/ Regulation	Smallmouth and largemouth bass	Walleye	Northern Pike	Panfish
Daily limit	June 18- Nov 30 5 in total	March 2- May 6 = 1 May 7 to Mar 1 = 5	May 7- Mar 1 = 5	25 in total
Season	May 7- June 17 Catch and release only	Open all year	Closed Mar 2- May 6	Open all year
Size limit	14 inches	15 inches	None	None

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LITERATURE CITED

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