2019 Crow Wing County Aquatic Invasive Species Prevention Plan

Mission:

To provide leadership in preventing the introduction and limiting the spread of Aquatic Invasive Species (AIS) in Crow Wing County by coordinating inspection, decontamination, targeted treatment, and education efforts.

Partners:

Crow Wing County has developed a network of public, private, state, and local partners that enables a strategic use and prioritization of resources to combat the spread of AIS in our waters. This plan will continue to build upon this network to increase awareness of AIS and limit their spread.

Public Input:

This plan was developed with input via a public comment period for concerned citizens and other stakeholders from December 31, 2018 to January 30, 2019.

Plan Activities & Budget:

The 2019 allocation of State AIS funds ($443,109 + $24,142.78 carry over from 2018) is proposed as follows:

- **$376,284 = Watercraft Inspections.** Crow Wing County proposes to allocate 16,700 watercraft inspection hours on 43 public access landings across the County. Crow Wing County has partnered with the University of Minnesota – Aquatic Invasive Species Research Center (MAISRC) and the United States Department of Agriculture – Forest Service to develop an optimized model for locating DNR trained watercraft inspectors on Crow Wing County's public watercraft access landings. The model was developed to specifically maximize the number of inspected watercraft that move from infested (AIS) to uninfested water bodies. Objective data from multiple sources was utilized to build the model, including:
    - Location of infested and uninifested lakes
    - Average boats per-hour inspected (2016-18) at 28 ramps in infested lakes in Crow Wing County.
    - Number of watercraft moving from infested lakes to uninfested lakes (derived from MAISRC research and MN-DNR watercraft inspection field-collected data). This includes estimates of watercraft moving from:
        - Within the county
        - Within the county to outside the county
        - Outside the county to within the county

With 30 public access ramp landings identified in the results, the model predicts coverage of at least 85% of watercraft moving from infested to uninfested water bodies. The results also showed that best prioritization of landings will be achieved when inspecting zebra mussel infested lakes with a lot of boat traffic and zebra mussel uninfested lakes with a lot of incoming traffic from out of the county. To further improve coverage and further prevent the spread of AIS, the County added 13 additional landings not identified in the model, based on high-use landings. In total, the 16,700 watercraft inspection hours on 43 landings will be allocated in the following manor (see Appendix 1 for list of landings):

- 520 hours to landings that received at least 2 inspections per-hour (from 2016-18 County inspection data) and also appeared in the model's results (20 landings).
- 300 hours to landings that received at least 1 inspections per-hour (from 2016-18 County inspection data) and also appeared in the model's results (10 landings).
- 300 hours to the 10 highest average inspections per-hour landings that had at least 1 inspections per-hour (from 2016-18 County inspection data) and were not identified in the models results (10 landings).
- 100 hours to the next two (2) highest inspections per-hour landings not included in the model (2 landings) or above and were also infested with AIS. Plus, one (1) landing that is new in 2018 on Nisswa Lake where inspection data gathering is needed.
- Any landings identified in the model that had less than one (1) average inspection per hour (from 2016-18 County inspection data) were removed from consideration for watercraft inspections regardless of other

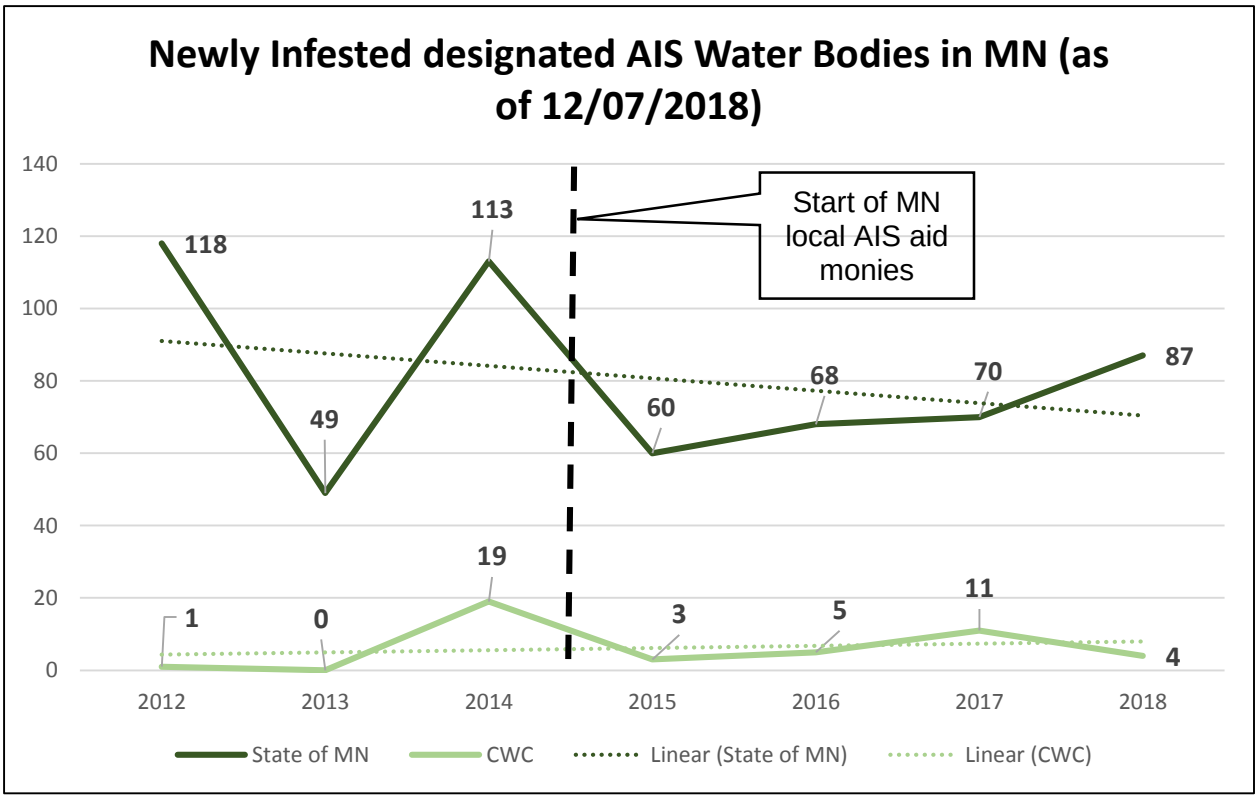
factors.

Watercraft inspectors will generally be staffed on weekends from mid-May through mid-September from mid-morning through late afternoon.

The County also plans to continue to provide monies to local government units (LGUs) who have a signed active delegation agreement with the Minnesota DNR to facilitate watercraft inspections on County allocated landings in 2019.

Landings that have not been identified for watercraft inspections are still part of the 2019 AIS Prevention Plan, but in a different way. The County will rely on trained volunteers and education / awareness campaigns generally prioritized by Appendix 2's "2019 AIS Risk Model - % chance of zebra mussel infestation by 2025". This list of all public water bodies in Crow Wing County was developed by MAISRC as part of a 2016-18 study that forecasted the potential risk of spread of zebra mussels across Minnesota. The model took account introduction probability, establishment probability, and levels of management interventions[1]. This model may be used as a decision-making tool to generate effective intervention strategies and design cost-effective surveillance programs to mitigate and prevent the spread of AIS. A map is also included as part of this Plan that attempts to visually show the same "Appendix 2" water bodies with colored water bodies to highlight risk differences.

New in 2019, Crow Wing County plans to hire a full-time permanent/year-round Environmental Services Specialist to coordinate the County's AIS prevention and management program including the hiring and management of watercraft inspectors completely in-house without the use of a staffing agency to facilitate hiring of seasonal employees (inspectors). We believe this approach will improve inspection quality, provide year-to-year consistency, and allow the program to build on other areas of AIS prevention and management beyond inspections (i.e., education and outreach).



[1] For more information about this research project, see: https://www.maisrc.umn.edu/modeling-ais. Risk model results and downloadable scores were accessed on 12/17/2018.

- **$18,297 = Decontaminations.** Located at the Joint Maintenance Highway Facility in Crosslake, approximately 750 hours (+/-) to Remove AIS using DNR-trained Level II inspectors. The decontamination station will be fully staffed Friday through Monday, 9:00am to 7:00pm and closed from Tuesday through Thursday with no on-call available. An AIS decontamination hotline will be available for the general public to call, 24 hours a day. The number will assist with providing customers the locations of the closest open decontamination stations to where they are located.

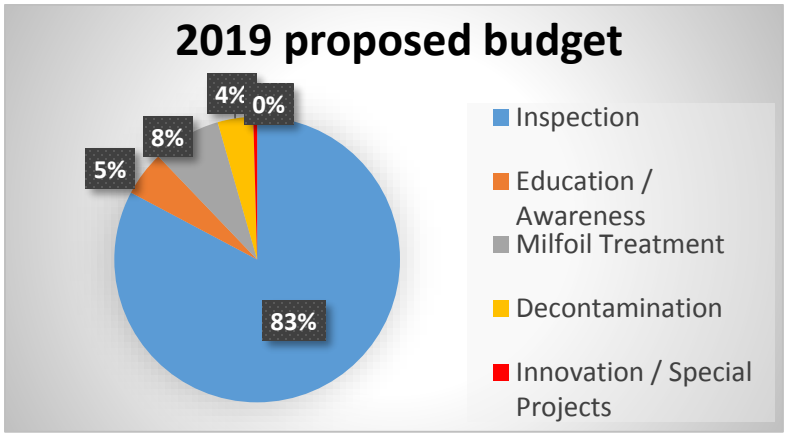
  This funding also includes DNR training, general supplies/maintenance, portable toilet rental, and subsidizing private party and local government unit (LGU) decontaminations by providing 200 hours of Level II inspections for the Ruth Lake DNR-approved decontamination station in Crow Wing County. The plan does not include monies to support decontaminations at the Breezy Point – Pelican Square decontamination station in 2019 due to inspection data indicating lack of use.

- **$23,100 = Education & Awareness.** The County plans to commit approximately $9,000 of this allocation to continue its important partnership with the Mississippi Headwaters Board (MHB) through their Minnesota Traditions AIS prevention campaign, although in a reduced capacity in 2019. Funds will be allocated to specifically support the social media “arm” of Minnesota Traditions as it has yielded strong objective results and reached targeted people in the past. Funds will also be spent on up to 18 lakes for lake association public awareness campaigns ($250 per lake with a boat landing), hand-outs at the landing (i.e., bait bags, towels, etc.), print media (rack cards, newspaper ads, stickers, posters, etc.), newsletter(s), and other targeted advertising (movie theaters, online, etc).

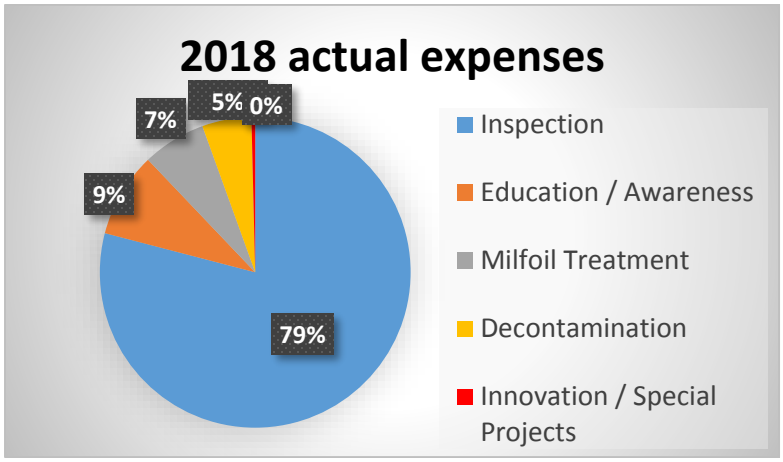
- **$35,000 = Milfoil Treatment.** AIS monies will pay for one survey and all treatments for control of Eurasian Water Milfoil up to $4,000 total per-lake on 11 eligible infested lakes with a public access. Eligible lakes include Bay, Clearwater, Crooked (newly infested in mid-2018), Emily, Kimble, Lower Mission, Ossawinamakee, Pine (adjacent to Pine River, near Whitefish Chain), Ruth, Upper Mission, and White Sand Lake.

- **$2,000 = Innovation / Special Projects.** Zebra mussel veliger sampling (CWC to pay for lab costs, lake associations to conduct sampling) in July for up to 25 lakes that are uninfested by designated AIS.

Proposed 2019 Budget:



2018 actual expenses:

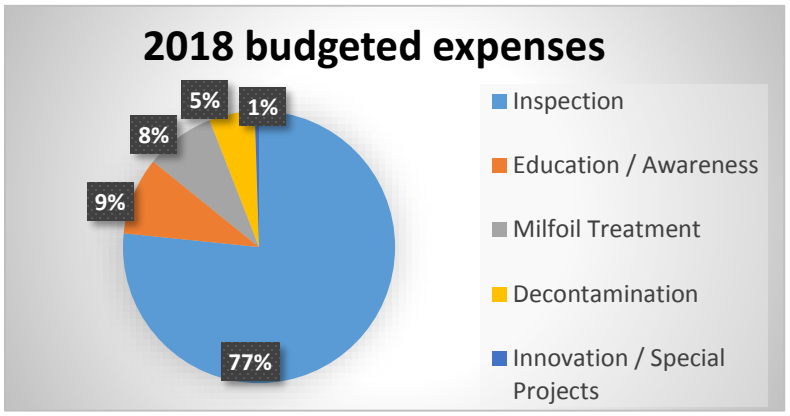


Proposed 2019 CWC AIS Budget

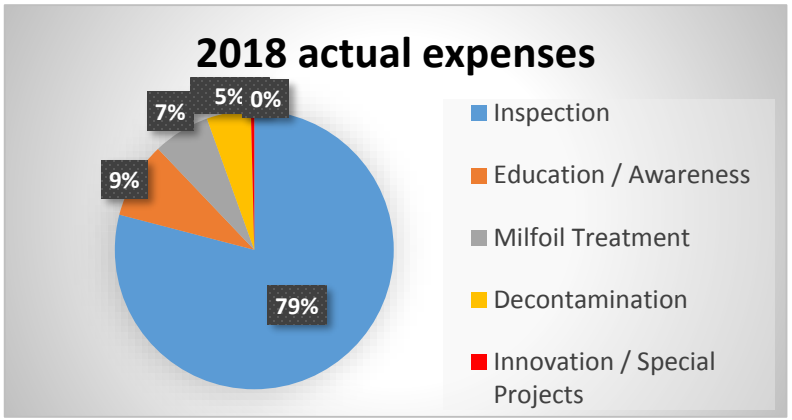
Inspection	Amount	Notes
Hiring coordination and facilitation	$10,000	HR related expenses related to the advertising, facilitating, coordination, and hiring of watercraft insepctors
Level I Inspection Hours	$267,214	Inspector wages and fringe for 16,600 total hours on 42 landings
AIS staff lead position mileage	$3,500	Mileage reimbursement for traveling to/from landings
Training for Level I Inspectors	$17,763	DNR and County initiated training including landing double-up
Supplies & Equipment	$12,500	New tablets, cases, sponges, peronnel manual, etc.
Communications	$1,000	County provided cell phone + mifi for AIS lead staff
County Staff Coordination	$64,307	New permanent full-time County staff lead position (salary + benefits)
Total Inspection	***$376,284***	
Decontamination		
Level II Crosslake inspection hours + decon. Program reimburse	$16,449	Approximately 750 (+/-) hours of Level 2 inspections at Crosslake + monies for Ruth Lake decontamination station
Training for Level II Inspectors	$348	DNR initiated training
General Operating Supplies	$1,500	General maintenance/supplies for the Crosslake decontamination unit
Total Decontamination	***$18,297***	
Education & Awareness		MHB social-media campaign, $250 lake assoc. grant per lake w/ boat access;
Lake Association marketing, print media, targeted advertising	$23,100	movie theater ad, landing hand-outs, other marketing efforts, etc.
Total Education & Awareness	***$23,100***	
Milfoil Treatment		
DNR-approved treatment & related surveys by licensed experts	***$35,000***	Up to $4k for each eligible Lake: *Bay, Clearwater, Crooked (**new-2019**), Emily, Kimble, Lower Mission, Ossawinnamakee, Pine, Ruth, Upper Mission, & White Sand*
Innovation / Special Projects		
Special projects	$2,000	Lab costs for veliger testing of non-designated AIS infested lakes
Total Innovation / Special Projects	***$2,000***	
AIS income / existing available funds	**$467,252**	$443,109 from the MN Dept. of Revenue for local County aid money; $24,142.78 from existing carry-over funds from 2018
2019 Total AIS Projected Expenses	**$454,681**	Total projected expenses from each expense category (above)

2018 & 2019 budget vs. actual expenses

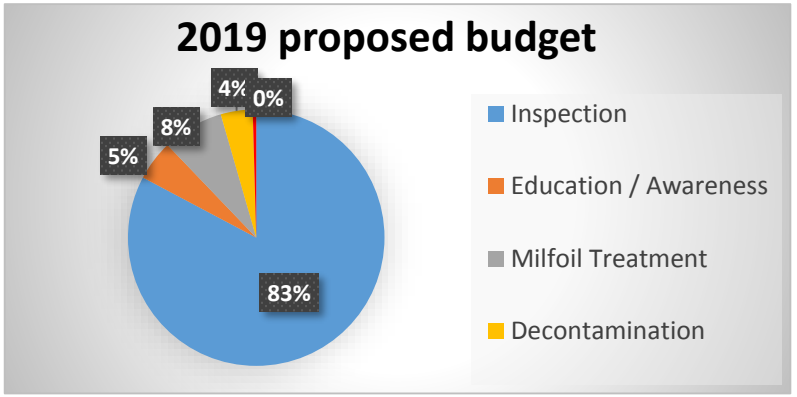
2018 budgeted expenses	
Inspection	$370,388
Education / Awareness	$44,500
Milfoil Treatment	$40,000
Decontamination	$26,100
Innovation / Special Projects	$2,500



2018 actual expenses (as of 12/18/2018)	
Inspection	$357,030
Education / Awareness	$39,884
Milfoil Treatment	$29,785
Decontamination	$23,166
Innovation / Special Projects	$1,760



2019 proposed budget	
Inspection	$376,284
Education / Awareness	23,100
Milfoil Treatment	35,000
Decontamination	$18,297
Innovation / Special Projects	2,000
2019 State of MN Revenue:	$443,109
Balance forward from 2018 (estimated)	$24,143
2019 proposed expenses:	$454,681
Carryover to 2020:	$12,571

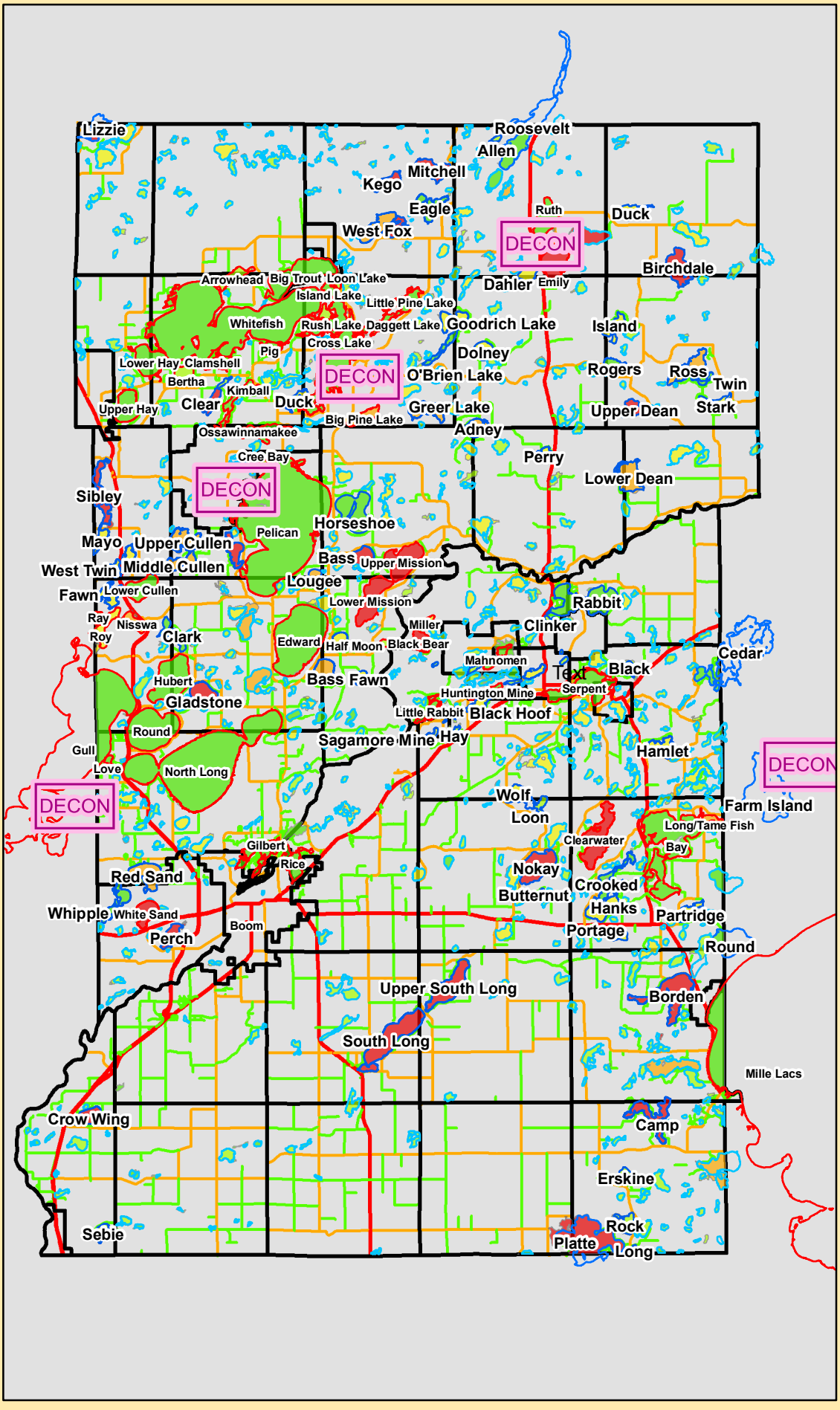


APPENDIX 1 - Proposed 2019 Level I Inspection Hours by Lake

Lake / Access	Infestation status	2018 Allocation	Proposed 2019 Level I Hours	% change	
Bay	EWM, ZM	520	520	0.0%	Increase from 2018
Big Trout+++	ZM	520	520	0.0%	Decrease from 2018
Black Bear	ZM	100	0	-100.0%	
Borden		300	300	0.0%	
Camp		300	300	0.0%	
Clamshell+++	ZM	520	520	0.0%	
Clark	ZM	100	0	-100.0%	
Clearwater	EWM	300	300	0.0%	
Crooked / Portage	EWM	300	300	0.0%	
Crosslake - USCOE Campground+++	ZM	520	520	0.0%	
Crosslake SW+++	ZM	520	520	0.0%	
Crow Wing		300	300	0.0%	
East Fox*		300	300	0.0%	
Edward	ZM	520	520	0.0%	
Emily	EWM	300	300	0.0%	
Gilbert	ZM	300	300	0.0%	
Gladstone		300	0	-100.0%	
Gull East	ZM	520	520	0.0%	
Horseshoe		300	300	0.0%	
Hubert	ZM	300	520	73.3%	
Kimball	EWM, ZM	300	0	-100.0%	
Little Rabbit	ZM	100	0	-100.0%	Removed due to having <1 inspection/hr
Lower Cullen	ZM	300	300	0.0%	
Lower Hay	ZM	520	520	0.0%	
Lower Mission**	EWM	100	0	-100.0%	
Middle Cullen	ZM	100	0	-100.0%	
Mille Lacs Garrison Wayside (Pike Point)	Spiny WF, EWM, ZM	520	520	0.0%	
Nisswa Lake	ZM	0	100	100.0%	New DNR public landing in 2018
Nokay		300	300	0.0%	
North Long - 371***	ZM	300	520	73.3%	
North Long - Merrifield***	ZM	520	520	0.0%	
Ossawinnamakee	EWM, ZM	300	520	73.3%	
Pelican, Breezy Point Resort +	ZM	520	520	0.0%	
Pelican, City Ramp +	ZM	300	300	0.0%	Lowered from 520 to 300 due to inspection data
Pelican, Halverson +	ZM	100	100	0.0%	
Pelican, Jones Bay +	ZM	520	520	0.0%	Raised from 300 to 520 due to inspection data
Pennington mine pit	ZM	100.0	300	200.0%	
Pine	EWM	100.0	0	-100.0%	
Platte		300	520	73.3%	
Rabbit		300	300	0.0%	
Rice	ZM	300	520	73.3%	
Round	ZM	520	520	0.0%	
Ruth	EWM, ZM	300	300	0.0%	
Serpent East++	ZM	100	100	0.0%	
Serpent West++	ZM	300	520	73.3%	
Sibley		300	300	0.0%	
South Long (Lower)		520	300	-42.3%	
Upper Hay	ZM	300	300	0.0%	
Upper Mission**	EWM	100	0	-100.0%	
Upper South Long		520	300	-42.3%	
Upper Whitefish+++	ZM	300	520	73.3%	
White Sand	EWM	300	300	0.0%	
Total:		16,600	16,700	0.6%	

* = Formerly grouped as "50 Lakes" landings
** = Formerly grouped as "Mission Lakes" landings
*** = Formerlly grouped as "North Long" landings
+ = Formerly grouped as "Pelican" landings
++ = Formerlly grouped as "Serpent Lake" landings
+++ = Formerlly grouped as "WAPOA" landings

2019 AIS Risk Model, Crow Wing County
% chance of Zebra Mussel infestation by 2025



Legend

- Township/city
- DECON — Decontamination station
- 0% (already infested with ZM)
- 0.01% - 2.77%
- 2.78% - 6.42%
- 6.43% - 12.85%
- 12.86% - 21.21%

Roads

Road Type

- US Highway
- State Highway
- County Road
- Township Road

Water Bodies by Infested Status

- Infested (Milfoil and/or Zebra Mussels)
- Lakes w/Public Access
- Other Lakes

CROW WING COUNTY MINNESOTA

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12/29/2018

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18022500	adney	322	6.99%
18006000	agate	203	4.86%
18074100	airport pond	9	0.04%
18020800	allen	50	0.90%
18050000	anderson	12	0.00%
18021400	andrews	21	0.32%
18006500	ann	43	0.98%
18021300	anna	121	7.43%
18008000	arbor	102	1.70%
18064000	arla's pond	19	1.25%
18043800	armour #2 mine	26	0.96%
18036600	arrowhead	285	1.26%
18028600	art	25	1.56%
18046000	ashenbrenner	11	0.00%
18058400	bailey bog	66	1.78%
18003000	barbour	50	0.28%
18025600	bass	386	16.83%
18030600	bass	455	8.73%
18022900	bass	114	3.81%
18035800	bass	128	3.65%
18019100	bass	82	2.08%
18026400	bass	35	1.80%
18017300	bass	78	1.09%
18040200	bass	34	1.05%
18001100	bass	65	0.32%
18038400	bass	36	0.16%
18003600	bass	14	0.06%
18002600	bassett	32	0.06%
18003400	bay	2435	0.00%
18042600	berglund	36	0.33%
18035500	bertha	353	1.58%
18028500	big bird	205	4.97%
18029100	big stone	27	0.77%
18031500	big trout	1486	NA
18017500	birchdale	450	17.36%
18005900	black	105	2.25%
18014000	black bear	235	14.49%
18011700	black hoof	195	4.33%
18068700	blue	22	0.64%
18021100	blue	185	0.00%
18030300	boiler	18	0.28%
18025900	bonnie	83	3.73%
18052900	boom	7	0.00%
18002000	borden	1038	18.91%
18007700	bordwell	44	0.94%
18021500	buchite	43	1.48%
18015200	buffalo	36	0.15%
18001400	bulldog	151	1.30%
18000500	bullhead	14	0.07%
18056500	bullhead	11	0.01%
18023100	butterfield	225	5.19%
18010800	butternut	28	0.26%
18001800	camp	537	17.65%
18030700	campbell	96	0.00%

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18017900	caraway	30	0.10%
18008300	carlson	123	2.94%
18039500	carlson	45	0.71%
18075000	carlson mine	9	0.30%
18006100	cascade	63	1.28%
18008700	casey	68	0.90%
18002500	chandler	21	0.03%
18009500	chrysler	114	1.48%
18035600	clamshell	238	14.99%
18037400	clark	309	NA
18036400	clear	242	14.19%
18042000	clears	45	1.48%
18003800	clearwater	917	19.50%
18013100	clinker	89	2.49%
18041400	clough	274	5.34%
18075900	clover hill (survey 0204)	5	0.00%
18040600	cloverleaf	39	1.33%
18003900	coffee	24	0.09%
18012700	cole	114	3.61%
18026500	command	21	1.07%
18026200	cranberry	20	1.18%
18064500	cranberry	7	1.05%
18016800	cranberry	42	0.19%
18012500	crato	33	1.05%
18004100	crooked	462	17.00%
18000600	crooked	31	0.00%
18031200	cross lake reservoir	1884	NA
18015500	crow wing	373	17.37%
18034100	crystal	98	0.00%
18027100	daggett	284	NA
18020400	dahler	277	5.97%
18021700	davis	53	1.52%
18018800	deadman's	28	0.35%
18018200	deer	78	1.86%
18027600	dewdrop	20	1.61%
18001500	dewing	36	0.06%
18010700	dog	71	0.93%
18005800	dogfish	45	0.41%
18019500	dolney	264	5.84%
18017800	duck	310	5.65%
18031400	duck	160	4.88%
18024400	duck	20	0.21%
18029600	eagle	356	14.34%
18009900	eagle	249	5.12%
18029800	east fox	234	14.75%
18040700	east twin	164	5.26%
18025700	east twin	32	0.97%
18022100	east wood	32	0.34%
18020200	eastham	68	1.33%
18039600	edna	156	4.66%
18030500	edward	2844	NA
18020300	emily	675	20.75%
18000900	erskine	186	2.39%
18005100	esden	89	1.26%

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18023700	faupel	42	1.76%
18047900	fawcett	25	0.06%
18024000	fawn	132	3.86%
18030900	fawn	85	3.47%
18039700	fawn	93	3.07%
18007100	finn	36	0.26%
18040000	fish trap	44	1.38%
18024700	flanders	181	5.57%
18013200	flynn	46	1.48%
18022400	fool	250	5.80%
18062600	four acre	13	0.94%
18014100	fuchs	26	0.00%
18032900	garden	262	6.76%
18046200	gibson	40	0.00%
18032000	gilbert	391	NA
18033800	gladstone	457	16.95%
18022300	goggle	107	4.04%
18022600	goodrich	398	5.84%
18005700	goose	90	1.62%
18017700	goose	46	0.44%
18036200	grass	52	2.49%
18023000	grass	78	2.20%
18011000	grave	177	3.41%
18023300	green	14	0.08%
18024600	greenwood	146	4.24%
18028700	greer	384	7.71%
18033200	guida	50	2.06%
18023800	half moon	70	2.62%
18007000	hamlet	313	5.34%
18014900	hampton	14	0.00%
18004400	hanks	171	3.60%
18010100	happy	51	0.85%
18039200	hartley	142	3.05%
18012000	hay	44	1.09%
18044400	hay	46	0.83%
18027000	hen	138	0.72%
18031300	henry	23	1.38%
18047600	hogsback	21	0.02%
18040100	hole-in-the-day	217	2.28%
18002900	holt	156	2.23%
18064300	hooligans hole	5	0.48%
18074700	hopkins mine pit	31	0.77%
18025100	horseshoe	974	20.58%
18014400	horseshoe	232	5.32%
18023400	horseshoe	43	1.03%
18004300	horseshoe	50	0.61%
18031700	horseshoe	33	0.34%
18037500	hubert	1344	NA
18012800	hunter	28	1.03%
18067400	hunting shack	7	0.00%
18044100	huntington mine	89	NA
18019000	indian jack	92	2.52%
18026900	island	193	NA
18018300	island	256	5.87%

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18012900	island	128	3.20%
18019300	island	78	1.97%
18038300	island	85	0.92%
18005200	island	37	0.18%
18036500	island	71	0.00%
18002300	jack pine	149	1.93%
18039400	jacks	30	0.46%
18041500	jail	190	4.03%
18000400	jennison	31	0.14%
18006400	jim	11	0.07%
18015000	jinks	33	0.00%
18074500	joan mine pit	19	0.61%
18032800	johnson	129	4.19%
18011600	june	71	2.44%
18075100	keeler mine	4	0.38%
18029300	kego	299	16.95%
18001900	kenney	108	1.41%
18036100	kimball	186	NA
18012400	klondyke	18	0.59%
18003500	knieff	43	0.41%
18000700	kutil	33	0.25%
18024800	lake	12	0.05%
18006200	larson	52	0.96%
18027500	lily pad	47	2.11%
18025400	little bass	94	3.95%
18019900	little bass	43	0.80%
18027900	little beaver	14	1.23%
18011800	little black hoof	60	1.36%
18037000	little cranberry	19	0.23%
18020700	little emily	142	3.63%
18007500	little hamlet	31	0.00%
18034000	little hubert	193	4.77%
18074300	little jim	7	0.09%
18032400	little markee	15	0.33%
18044800	little menomin	25	0.57%
18030200	little ox	50	0.68%
18035100	little pelican	402	15.46%
18019400	little pickerel	15	0.72%
18026600	little pine	384	NA
18017600	little pine	135	1.73%
18013900	little rabbit	153	NA
18035700	little round	20	1.22%
18036000	little star	50	2.31%
18041600	lizzie	384	17.64%
18029200	lone pine	20	0.61%
18003100	long	80	0.52%
18050100	long	15	0.14%
18000200	long / tame fish	123	12.02%
18012300	lookout	256	5.47%
18011100	loon	54	1.20%
18004000	loon	64	0.97%
18026800	loon	50	0.50%
18008500	lost long	34	0.63%
18034200	lougee	217	12.85%

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18038800	love	88	NA
18040300	lower cullen	469	NA
18018100	lower dean	533	8.90%
18037800	lower hay	720	NA
18024300	lower mission	739	20.28%
18018000	lows	320	6.41%
18008400	luanna	20	0.35%
18065700	lund	39	1.27%
18034700	lynch	85	4.29%
18012600	mahnomen	468	8.71%
18044000	mahnomen, alstead & arco	215	NA
18033400	mallard	73	3.04%
18030000	mallard	18	0.81%
18074000	mallen pit	5	0.39%
18074400	mangan mine pit	17	NA
18043500	manuel mine	80	2.45%
18004500	maple	68	1.18%
18002200	maple	20	0.06%
18034300	markee	121	3.39%
18018500	mary	491	14.91%
18040800	mayo	148	3.93%
18026700	mcclain	46	2.17%
18030100	meyer	85	2.92%
18037700	middle cullen	405	10.48%
18013000	milford	70	2.18%
18013300	miller	103	3.23%
18002100	miller	137	1.86%
18015300	mine	21	0.01%
18021000	minnie	78	1.60%
18029400	mitchell	460	14.13%
18038900	moburg	41	0.93%
18033500	mollie	421	7.39%
18033900	moody	43	0.00%
18052000	morroco mine	58	1.75%
18032100	mud	185	4.10%
18032600	mud	82	3.03%
18019800	mud	103	2.98%
18013700	mud	132	2.89%
18009400	mud	78	2.30%
18016000	mud	153	1.39%
18016600	mud	78	1.27%
18039100	mud	51	1.22%
18035300	mud	18	0.92%
18025300	mud	20	0.43%
18001000	mud	48	0.27%
18005400	mud	32	0.12%
18057900	mud	25	0.07%
18015100	mud	75	0.03%
18069600	mud	12	0.00%
18016400	nelson	323	6.42%
18041100	nelson	100	1.50%
18039900	nisswa	213	8.08%
18010400	nokay	782	17.86%
18037200	north long	6178	NA

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18022700	o'brien	203	10.20%
18009100	olander	89	2.19%
18017100	olson	28	0.10%
18050300	orland	17	0.21%
18035200	ossawinnamakee	739	NA
18028800	ox	258	2.32%
18020600	papoose	91	1.38%
18004800	partridge	185	3.31%
18011400	pascoe	92	2.77%
18027700	pecks puddle	12	1.34%
18030800	pelican	8468	NA
18043900	pennington mine	58	1.09%
18037100	perch	284	16.56%
18030400	perch	181	5.58%
18010900	perch	43	0.40%
18018600	perry	160	4.67%
18007900	peterson	46	0.90%
18020500	pickerel	139	3.73%
18023200	pickerel	57	1.40%
18020000	pickerel	60	1.39%
18035400	pig	213	NA
18026100	pine	391	12.13%
18004600	pine	31	0.21%
18007600	placid	196	3.70%
18008800	platte	1768	19.39%
18027800	pleasant	22	1.65%
18010500	pointon	193	4.05%
18005000	portage	292	5.21%
18006900	portage	128	3.17%
18011500	portage	85	2.72%
18043700	portsmouth mine	130	3.49%
18020900	pug hole	51	1.07%
18009300	rabbit	1169	19.58%
18013400	rassett	43	0.91%
18034400	rat	27	1.26%
18041000	rat	100	1.19%
18038600	red sand	569	9.65%
18006700	reno	181	4.38%
18014500	rice	434	NA
18032700	rice	181	3.65%
18006800	rice	185	3.61%
18005300	rice	168	3.54%
18040500	rice	85	2.88%
18031600	rice	100	2.33%
18012100	rice	78	1.80%
18018700	rice bed	50	1.45%
18050900	ringhand	15	0.07%
18028200	rock	56	2.34%
18001600	rock	210	2.18%
18011900	roe mine	28	1.08%
18018400	rogers	249	0.00%
18012200	rose	55	1.07%
18016500	ross	504	8.54%
18037300	round	1706	NA

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18014700	round	144	1.61%
18003200	round	82	1.23%
18039800	roy	306	3.26%
18031100	rush	782	NA
18038100	rush	57	0.79%
18008200	rushmeyer	43	0.52%
18014200	russell	153	2.51%
18048700	russell	105	1.50%
18021200	ruth	623	NA
18052300	sagamore mine	120	4.03%
18029900	sand	107	2.96%
18003300	scott	178	3.20%
18016100	sebie	180	1.42%
18009000	serpent	1154	NA
18044600	sewells pond	16	0.00%
18034800	shaffer	117	4.16%
18046900	shay	15	0.01%
18007200	shirt	220	4.23%
18040400	sibley	412	15.26%
18023900	silver	213	5.25%
18019200	slough	30	0.30%
18002800	smith	486	7.04%
18022000	smokey hollow	131	8.02%
18017400	snodgrass	65	0.97%
18052400	snoshoe mine	8	0.37%
18032300	sorenson	92	3.12%
18013600	south long	1380	19.57%
18024100	spider	100	0.00%
18001700	spring	14	0.03%
18013800	spruce	57	1.12%
18058300	spruce	11	0.02%
18019600	square	36	0.95%
18018900	stanley	45	1.44%
18035900	star	153	4.32%
18016900	stark	228	4.98%
18032500	stevens	41	1.63%
18036700	stewart	254	4.77%
18036300	strawberry	21	1.00%
18016300	sullivan	80	1.64%
18002700	sunfish	16	0.01%
18009700	swamp	267	4.91%
18028100	tamarack	92	3.12%
18031800	tamarack	55	1.27%
18023600	taylor	38	1.65%
18067300	taylor	14	0.04%
18016200	terry	102	1.78%
18017200	thompson	20	0.13%
18028000	tiff	68	3.06%
18021800	trout	121	7.42%
18013500	turner	71	2.00%
18004700	turtle	100	1.61%
18000800	twenty two	169	1.72%
18033600	twin	75	2.85%
18016700	twin	59	0.72%

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18014800	twin	50	0.02%
18010600	twin island	85	0.00%
18059300	unnamed	83	3.51%
18061000	unnamed	97	2.67%
18038200	unnamed	139	2.62%
18069100	unnamed	103	2.42%
18022800	unnamed	50	2.14%
18061200	unnamed	100	2.02%
18032200	unnamed	85	1.99%
18059700	unnamed	40	1.98%
18021600	unnamed	64	1.87%
18058600	unnamed	75	1.86%
18034900	unnamed	52	1.85%
18033300	unnamed	46	1.75%
18027200	unnamed	29	1.65%
18041800	unnamed	50	1.61%
18027300	unnamed	40	1.58%
18065000	unnamed	21	1.53%
18026300	unnamed	38	1.45%
18034600	unnamed	33	1.45%
18060000	unnamed	22	1.45%
18039000	unnamed	50	1.44%
18056800	unnamed	39	1.33%
18033100	unnamed	40	1.30%
18024900	unnamed	43	1.28%
18060400	unnamed	11	1.28%
18019700	unnamed	47	1.24%
18027400	unnamed	15	1.21%
18055900	unnamed	37	1.17%
18069200	unnamed	46	1.17%
18039300	unnamed	50	1.15%
18064200	unnamed	12	1.15%
18071300	unnamed	40	1.14%
18036800	unnamed	46	1.13%
18050200	unnamed	52	1.12%
18061500	unnamed	40	1.12%
18064600	unnamed	5	1.12%
18071800	unnamed	42	1.12%
18067000	unnamed	31	1.11%
18034500	unnamed	23	1.10%
18049600	unnamed	70	1.10%
18065200	unnamed	14	1.08%
18058500	unnamed	31	1.07%
18026000	unnamed	32	1.04%
18052700	unnamed	47	1.01%
18071900	unnamed	42	1.01%
18068200	unnamed	33	1.00%
18025000	unnamed	28	0.99%
18060200	unnamed	11	0.96%
18072000	unnamed	31	0.96%
18063800	unnamed	8	0.95%
18042900	unnamed	43	0.94%
18050700	unnamed	34	0.92%
18066900	unnamed	25	0.92%

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18035000	unnamed	27	0.91%
18070700	unnamed	15	0.91%
18071500	unnamed	35	0.88%
18005500	unnamed	70	0.87%
18044500	unnamed	23	0.86%
18054400	unnamed	33	0.85%
18055000	unnamed	30	0.84%
18021900	unnamed	46	0.83%
18014300	unnamed	67	0.81%
18024500	unnamed	31	0.81%
18028300	unnamed	14	0.81%
18072300	unnamed	28	0.79%
18063300	unnamed	23	0.78%
18062800	unnamed	8	0.78%
18033700	unnamed	41	0.77%
18009200	unnamed	26	0.77%
18009800	unnamed	65	0.76%
18052200	unnamed	11	0.75%
18063200	unnamed	20	0.75%
18060100	unnamed	12	0.74%
18068800	unnamed	25	0.72%
18050400	unnamed	28	0.71%
18055300	unnamed	25	0.71%
18055500	unnamed	27	0.70%
18004200	unnamed	50	0.69%
18072200	unnamed	29	0.69%
18066700	unnamed	19	0.68%
18051500	unnamed	17	0.66%
18060700	unnamed	24	0.66%
18072100	unnamed	33	0.66%
18052600	unnamed	42	0.65%
18063400	unnamed	20	0.64%
18033000	unnamed	26	0.63%
18060300	unnamed	10	0.62%
18061600	unnamed	27	0.62%
18028900	unnamed	28	0.61%
18003700	unnamed	44	0.59%
18055700	unnamed	25	0.58%
18062100	unnamed	16	0.57%
18045000	unnamed	18	0.56%
18054300	unnamed	28	0.56%
18070500	unnamed	24	0.55%
18070800	unnamed	34	0.55%
18054600	unnamed	18	0.54%
18057200	unnamed	21	0.53%
18062700	unnamed	4	0.53%
18023500	unnamed	20	0.52%
18051600	unnamed	18	0.50%
18066100	unnamed	97	0.50%
18071600	unnamed	23	0.49%
18043100	unnamed	19	0.48%
18063700	unnamed	4	0.48%
18050600	unnamed	19	0.47%
18025500	unnamed	20	0.46%

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18054800	unnamed	13	0.46%
18045100	unnamed	21	0.44%
18043200	unnamed	21	0.43%
18044900	unnamed	21	0.43%
18055600	unnamed	23	0.42%
18015400	unnamed	57	0.41%
18053700	unnamed	28	0.41%
18050500	unnamed	20	0.40%
18069000	unnamed	18	0.40%
18072900	unnamed	15	0.40%
18020100	unnamed	16	0.39%
18051400	unnamed	13	0.39%
18048500	unnamed	64	0.38%
18051000	unnamed	36	0.38%
18066800	unnamed	15	0.37%
18052800	unnamed	45	0.36%
18054200	unnamed	19	0.36%
18072700	unnamed	19	0.36%
18001200	unnamed	33	0.35%
18007300	unnamed	35	0.35%
18010000	unnamed	18	0.35%
18065600	unnamed	19	0.35%
18068900	unnamed	13	0.35%
18059900	unnamed	13	0.34%
18054000	unnamed	18	0.33%
18008600	unnamed	19	0.32%
18008100	unnamed	28	0.31%
18043300	unnamed	16	0.31%
18054100	unnamed	20	0.30%
18065300	unnamed	10	0.30%
18071400	unnamed	20	0.30%
18042700	unnamed	20	0.29%
18059500	unnamed	18	0.29%
18029500	unnamed	22	0.28%
18000300	unnamed	36	0.28%
18011300	unnamed	16	0.28%
18055800	unnamed	10	0.28%
18063100	unnamed	6	0.28%
18063500	unnamed	10	0.28%
18064800	unnamed	4	0.28%
18066400	unnamed	26	0.27%
18068000	unnamed	18	0.25%
18057800	unnamed	35	0.25%
18069300	unnamed	17	0.25%
18006600	unnamed	18	0.24%
18045900	unnamed	48	0.24%
18060500	unnamed	10	0.24%
18063600	unnamed	12	0.24%
18057100	unnamed	18	0.23%
18069500	unnamed	20	0.23%
18070000	unnamed	16	0.23%
18058700	unnamed	13	0.22%
18065400	unnamed	7	0.22%
18048600	unnamed	47	0.21%

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18059800	unnamed	12	0.21%
18060600	unnamed	12	0.21%
18063000	unnamed	10	0.21%
18060900	unnamed	24	0.20%
18069700	unnamed	16	0.20%
18071100	unnamed	26	0.20%
18071700	unnamed	16	0.20%
18014600	unnamed	21	0.19%
18054900	unnamed	12	0.19%
18055100	unnamed	15	0.19%
18058000	unnamed	20	0.19%
18055200	unnamed	13	0.17%
18072600	unnamed	19	0.17%
18054500	unnamed	12	0.16%
18066300	unnamed	23	0.16%
18005600	unnamed	31	0.15%
18046700	unnamed	80	0.14%
18071200	unnamed	18	0.14%
18001300	unnamed	29	0.13%
18049500	unnamed	24	0.13%
18065900	unnamed	17	0.13%
18043000	unnamed	12	0.12%
18048800	unnamed	32	0.12%
18061100	unnamed	15	0.12%
18070300	unnamed	13	0.12%
18007400	unnamed	16	0.11%
18051200	unnamed	13	0.11%
18059400	unnamed	12	0.11%
18062500	unnamed	4	0.11%
18072400	unnamed	19	0.11%
18063900	unnamed	5	0.10%
18049400	unnamed	18	0.10%
18062300	unnamed	5	0.10%
18066500	unnamed	17	0.10%
18010300	unnamed	20	0.09%
18051100	unnamed	12	0.09%
18052500	unnamed	18	0.09%
18055400	unnamed	11	0.09%
18056700	unnamed	13	0.09%
18010200	unnamed	24	0.08%
18038500	unnamed	28	0.08%
18048200	unnamed	21	0.08%
18065500	unnamed	15	0.08%
18067100	unnamed	14	0.08%
18041900	unnamed	11	0.07%
18045300	unnamed	14	0.07%
18048400	unnamed	28	0.07%
18049100	unnamed	13	0.07%
18053500	unnamed	13	0.07%
18056600	unnamed	11	0.07%
18057300	unnamed	19	0.07%
18068400	unnamed	19	0.07%
18074800	unnamed	5	0.07%
18048000	unnamed	15	0.06%

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18051300	unnamed	12	0.06%
18062000	unnamed	8	0.06%
18065800	unnamed	13	0.06%
18066000	unnamed	15	0.06%
18069400	unnamed	12	0.06%
18070900	unnamed	13	0.06%
18041300	unnamed	18	0.05%
18006300	unnamed	14	0.05%
18042400	unnamed	16	0.05%
18042500	unnamed	19	0.05%
18045200	unnamed	13	0.05%
18045600	unnamed	22	0.05%
18053900	unnamed	12	0.05%
18056100	unnamed	11	0.05%
18056900	unnamed	15	0.05%
18067600	unnamed	16	0.05%
18067700	unnamed	8	0.05%
18072500	unnamed	9	0.05%
18049800	unnamed	22	0.04%
18038000	unnamed	18	0.04%
18042200	unnamed	20	0.04%
18042300	unnamed	20	0.04%
18047400	unnamed	25	0.04%
18049900	unnamed	15	0.04%
18053000	unnamed	18	0.04%
18053200	unnamed	22	0.04%
18054700	unnamed	12	0.04%
18061300	unnamed	20	0.04%
18061400	unnamed	12	0.04%
18061700	unnamed	10	0.04%
18068500	unnamed	10	0.04%
18070100	unnamed	8	0.04%
18036900	unnamed	10	0.03%
18042800	unnamed	13	0.03%
18045400	unnamed	12	0.03%
18045500	unnamed	10	0.03%
18049300	unnamed	13	0.03%
18059000	unnamed	9	0.03%
18067800	unnamed	10	0.03%
18071000	unnamed	10	0.03%
18072800	unnamed	10	0.03%
18047800	unnamed	13	0.02%
18049000	unnamed	15	0.02%
18050800	unnamed	4	0.02%
18056000	unnamed	10	0.02%
18056300	unnamed	12	0.02%
18057400	unnamed	21	0.02%
18058100	unnamed	14	0.02%
18059600	unnamed	12	0.02%
18067200	unnamed	18	0.02%
18068300	unnamed	10	0.02%
18069800	unnamed	9	0.02%
18046500	unnamed	15	0.01%
18046600	unnamed	15	0.01%

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18046800	unnamed	15	0.01%
18047200	unnamed	27	0.01%
18047500	unnamed	13	0.01%
18047700	unnamed	15	0.01%
18049200	unnamed	19	0.01%
18053100	unnamed	6	0.01%
18053800	unnamed	12	0.01%
18058900	unnamed	8	0.01%
18059200	unnamed	4	0.01%
18061800	unnamed	5	0.01%
18066600	unnamed	16	0.01%
18068600	unnamed	10	0.01%
18070600	unnamed	4	0.01%
18075700	unnamed	4	0.01%
18064400	unnamed	4	0.00%
18015600	unnamed	18	0.00%
18015700	unnamed	15	0.00%
18015800	unnamed	31	0.00%
18015900	unnamed	16	0.00%
18044700	unnamed	22	0.00%
18045700	unnamed	10	0.00%
18045800	unnamed	10	0.00%
18046100	unnamed	10	0.00%
18046300	unnamed	12	0.00%
18046400	unnamed	10	0.00%
18047300	unnamed	33	0.00%
18053300	unnamed	6	0.00%
18053400	unnamed	13	0.00%
18056200	unnamed	21	0.00%
18057600	unnamed	13	0.00%
18066200	unnamed	11	0.00%
18067500	unnamed	9	0.00%
18067900	unnamed	23	0.00%
18069900	unnamed	7	0.00%
18070200	unnamed	4	0.00%
18070400	unnamed	4	0.00%
18073000	unnamed	4	0.00%
18037600	upper cullen	459	8.70%
18017000	upper dean	263	14.68%
18041200	upper hay	640	NA
18024200	upper mission	895	21.21%
18009600	upper south long	793	18.46%
18007800	vang	36	0.62%
18028400	velvet	167	4.88%
18052100	virginia mine	23	0.77%
18029700	west fox	510	8.96%
18040900	west twin	130	3.22%
18025800	west twin	23	0.55%
18038700	whipple	345	17.27%
18037900	white sand	441	19.08%
18031000	whitefish	7969	NA
18000100	whitefish	760	12.54%
18002400	williams	47	0.13%
18004900	wilson	63	0.68%

Appendix 2: 2019 AIS Risk Model, Crow Wing County
% chance of zebra mussel infestation by 2025

DOW#	Lake Name	Acres	% risk of ZM by 2025
18008900	wilson	50	0.18%
18031900	wise	137	3.01%
18011200	wolf	218	4.76%
18029000	wolf	26	0.65%
18022200	wood	121	2.85%
18043400	yawkey mine	15	0.42%
18025200	young	71	3.12%