

What's it going to take to eradicate **elodea** from the Kenai Peninsula?

John Morton
Kenai National Wildlife Refuge

INTEGRATED PEST MANAGEMENT PLAN FOR ERADICATING ELODEA FROM THE KENAI PENINSULA

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Prepared by

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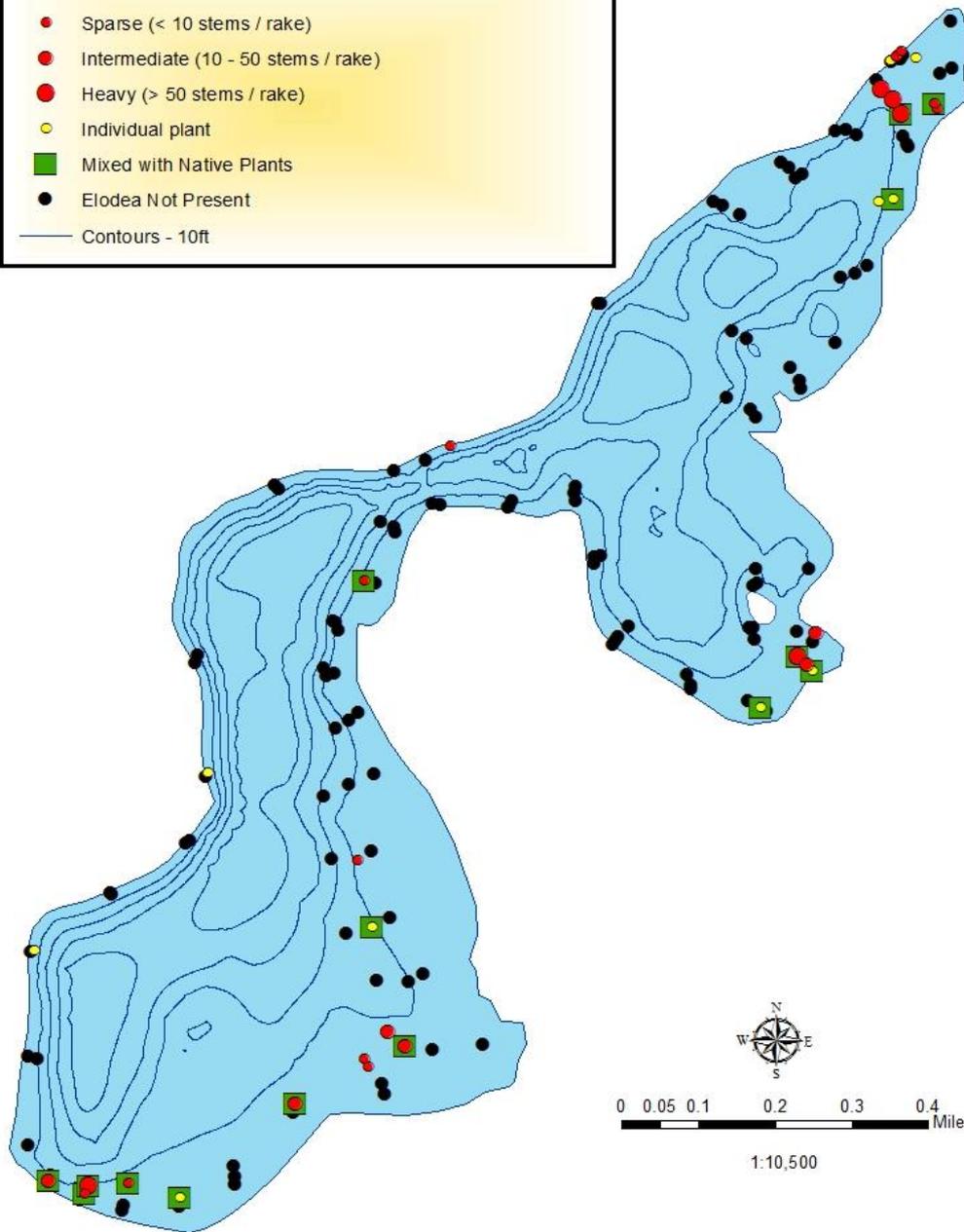


**Cooperative Weed
Management Area**

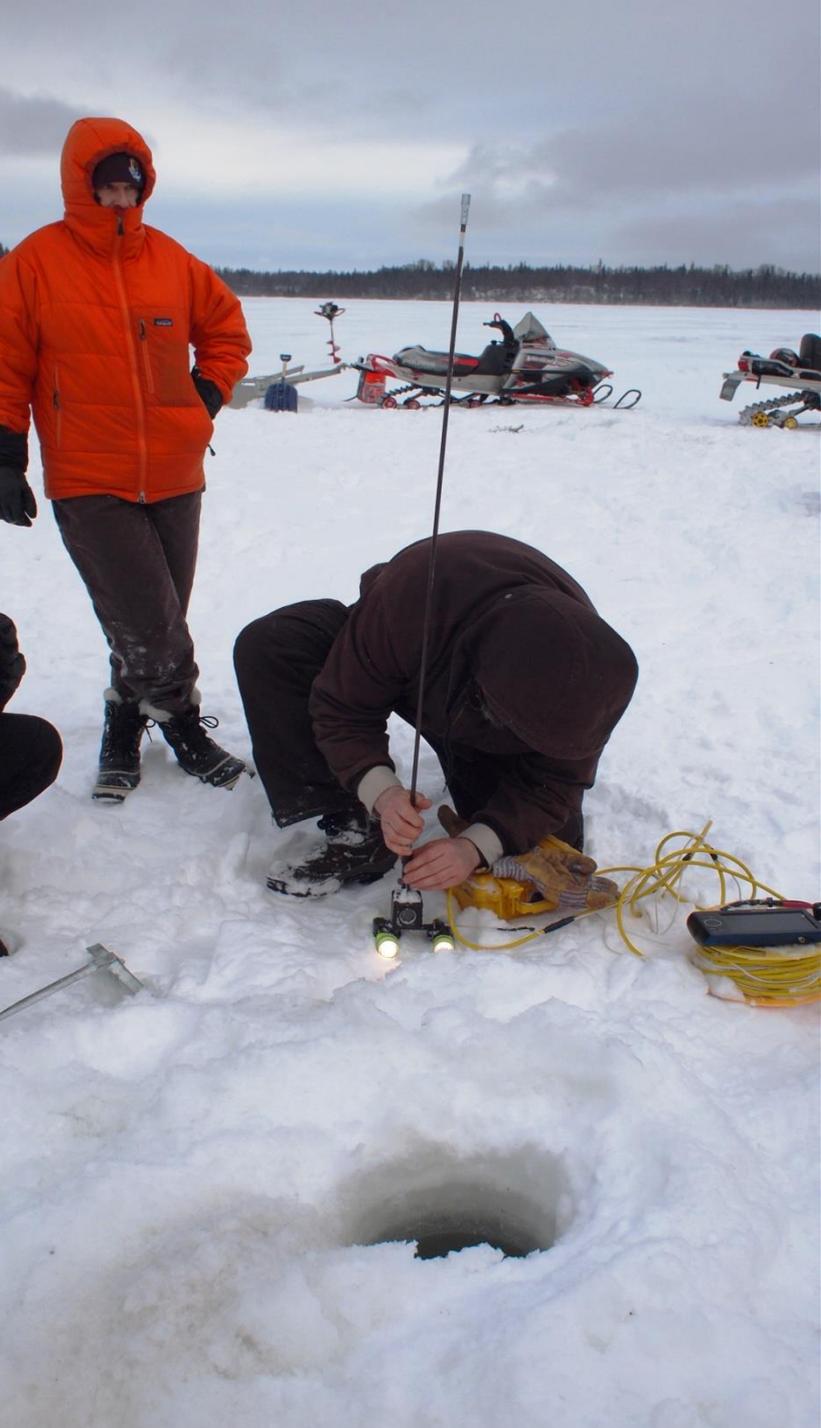


Stormy Lake Elodea Survey - September 2012

- Sparse (< 10 stems / rake)
- Intermediate (10 - 50 stems / rake)
- Heavy (> 50 stems / rake)
- Individual plant
- Mixed with Native Plants
- Elodea Not Present
- Contours - 10ft



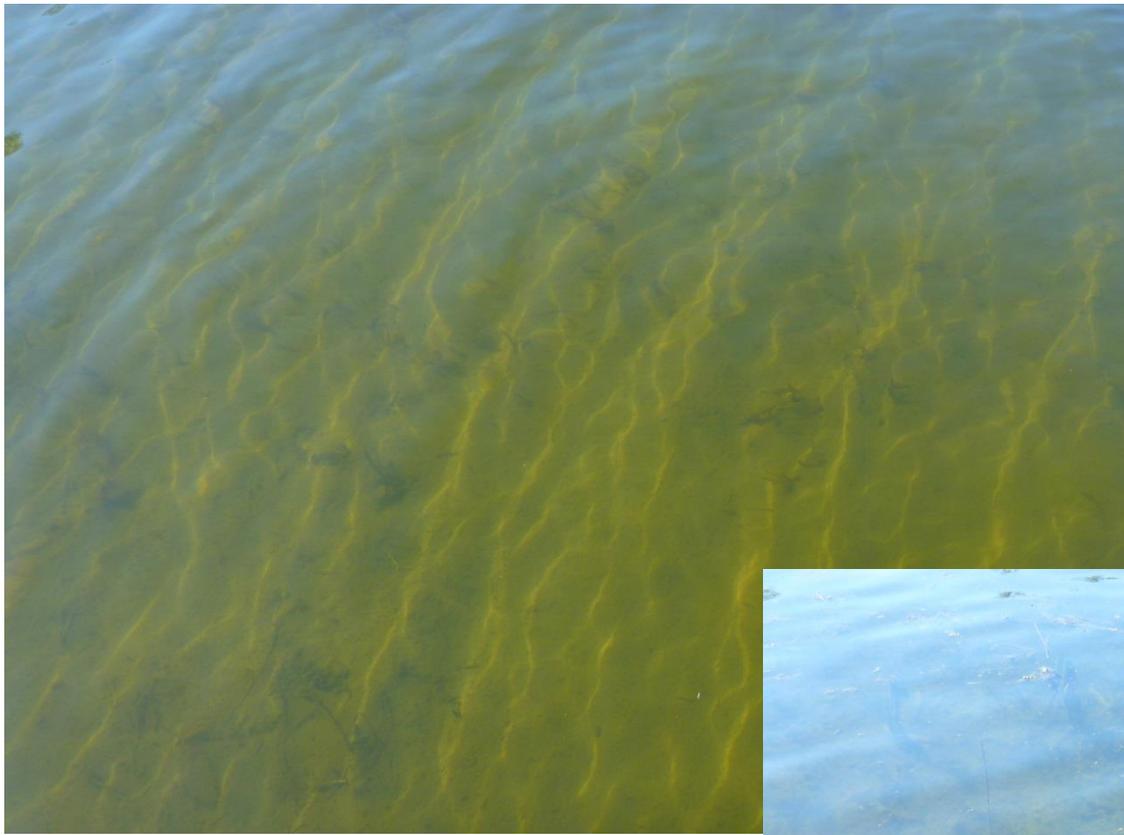






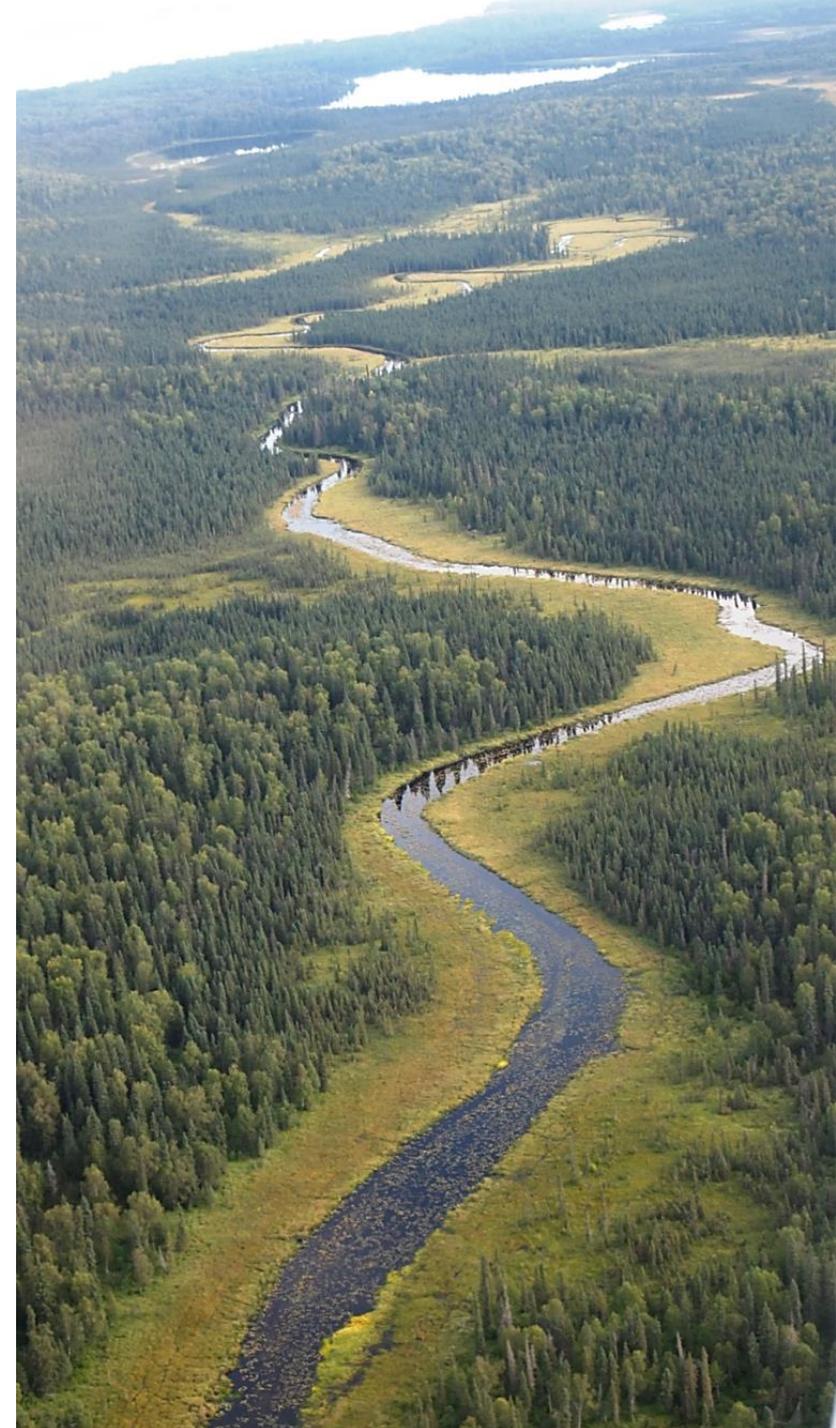


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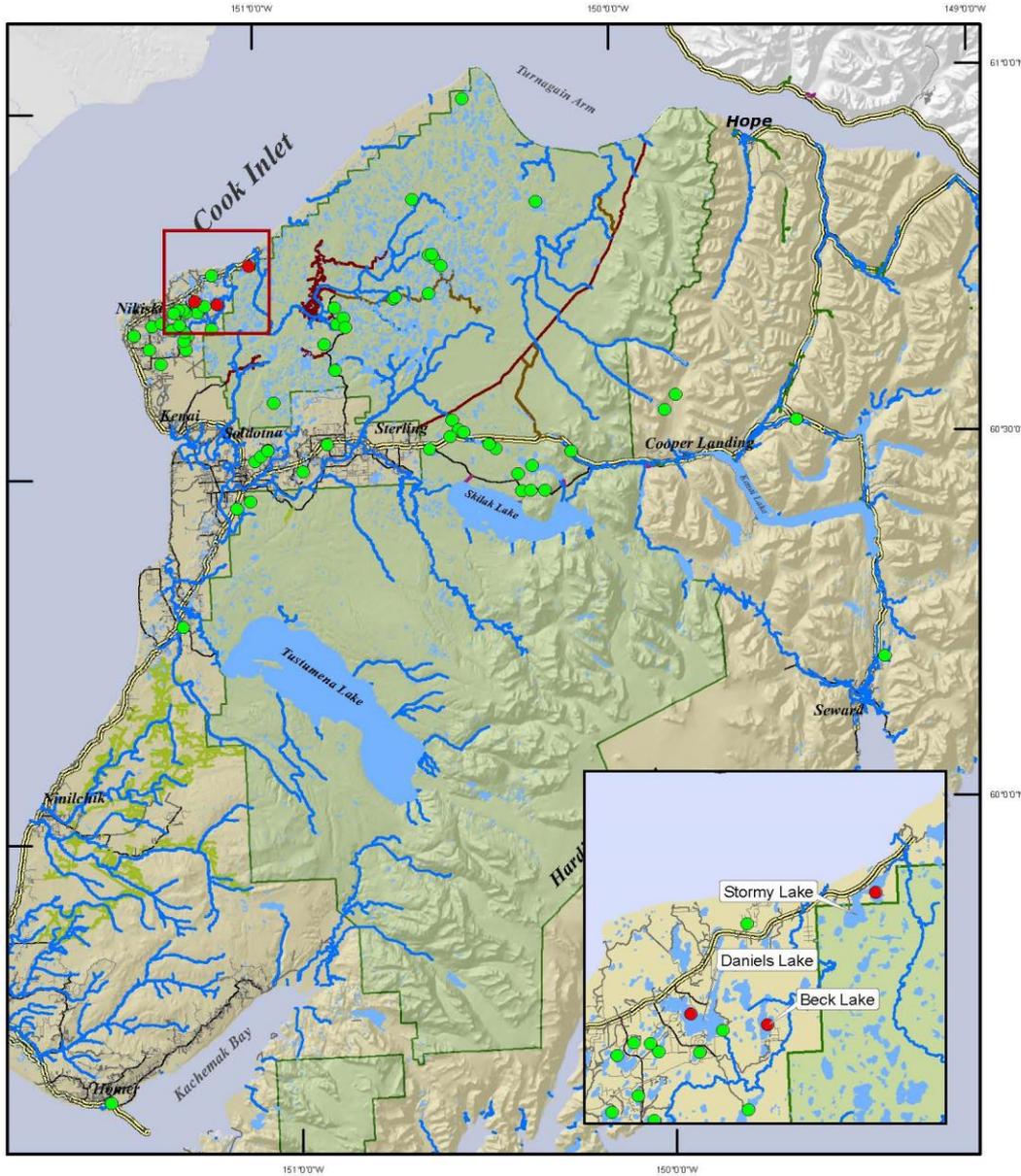






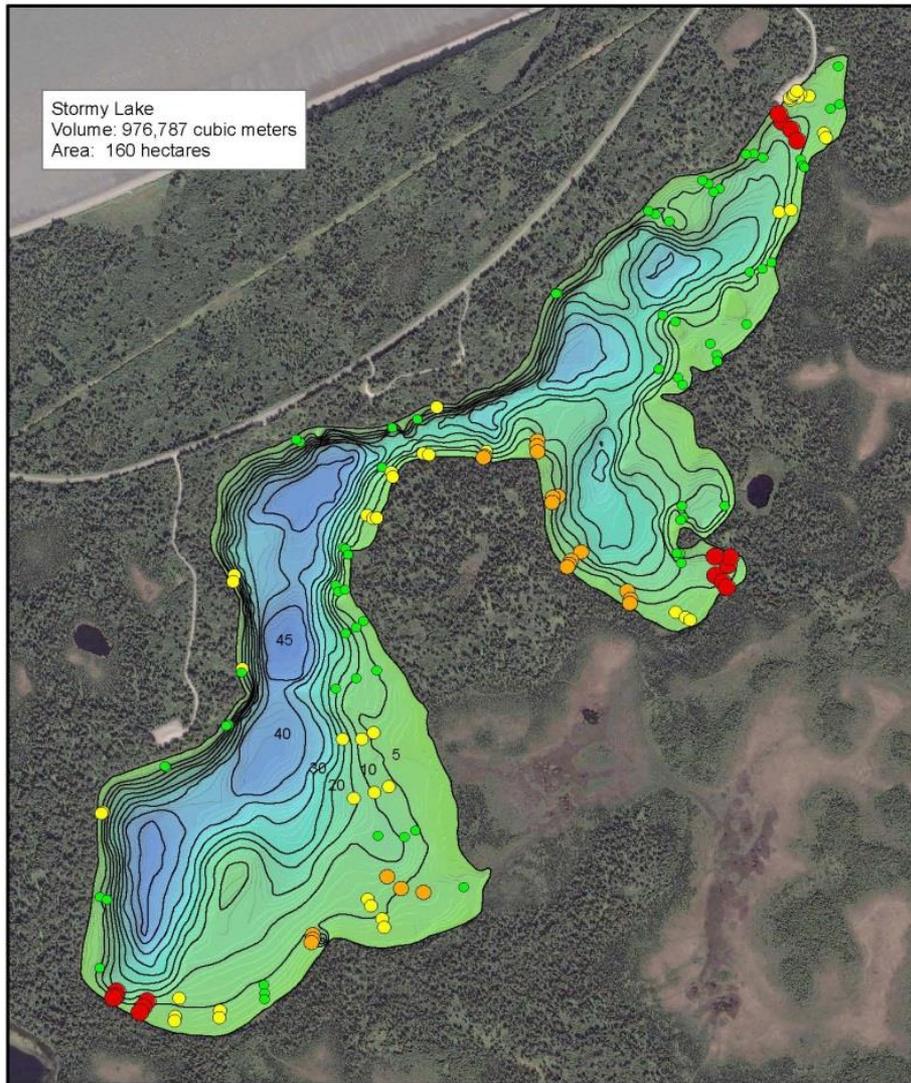






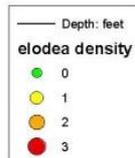
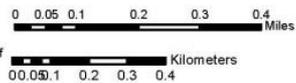
**68 at-risk lakes surveyed
 in summer 2013**

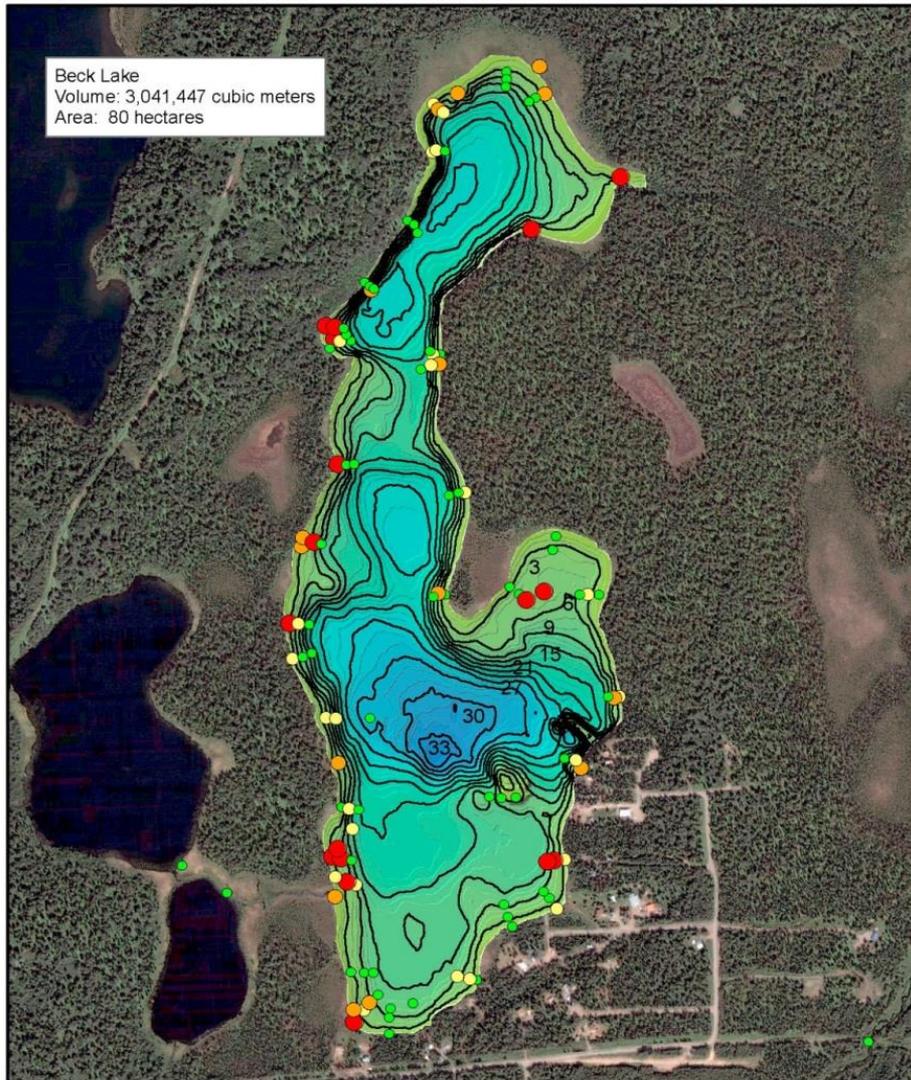




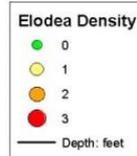
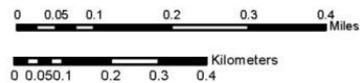
Stormy Lake requires whole-lake treatment

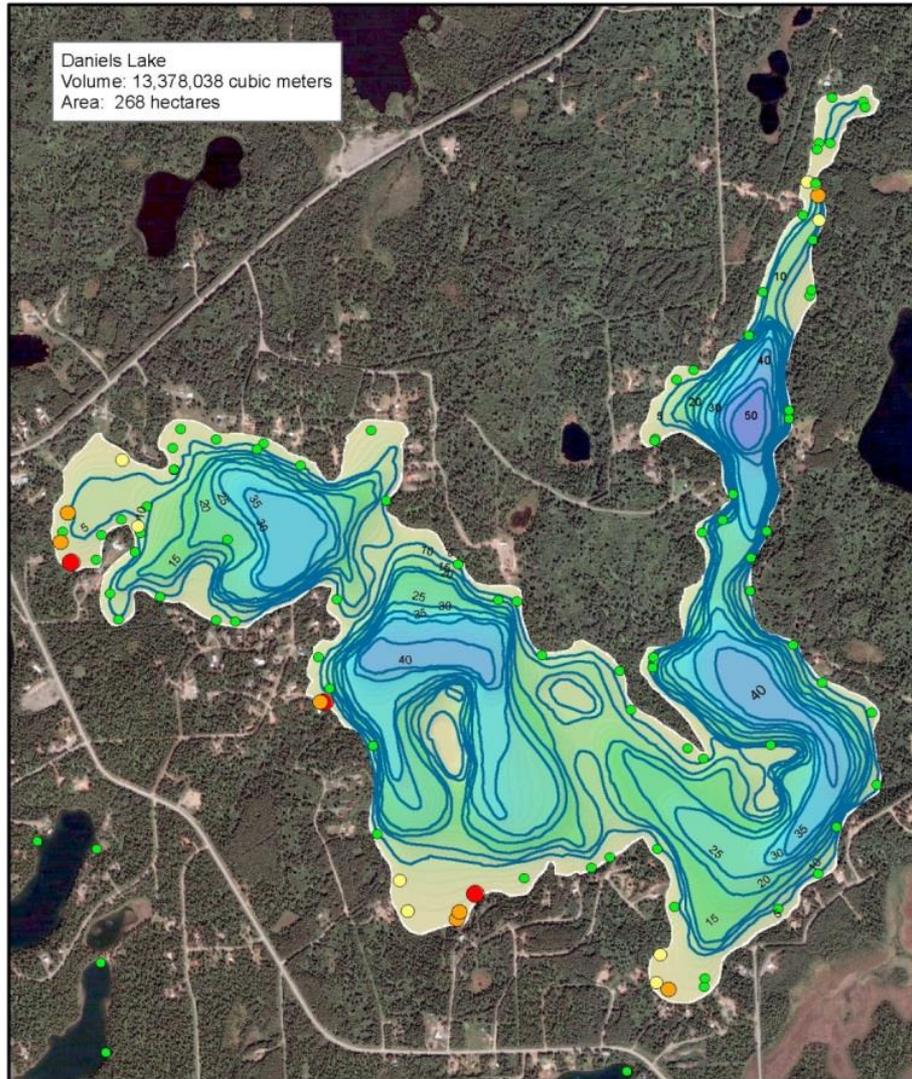
Produced in GIS Department
Soldotna, Alaska
Current to: November 15, 2013
File: map_StormyLakeElodeaSurvey.pdf





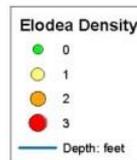
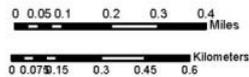
Beck Lake requires whole-lake treatment

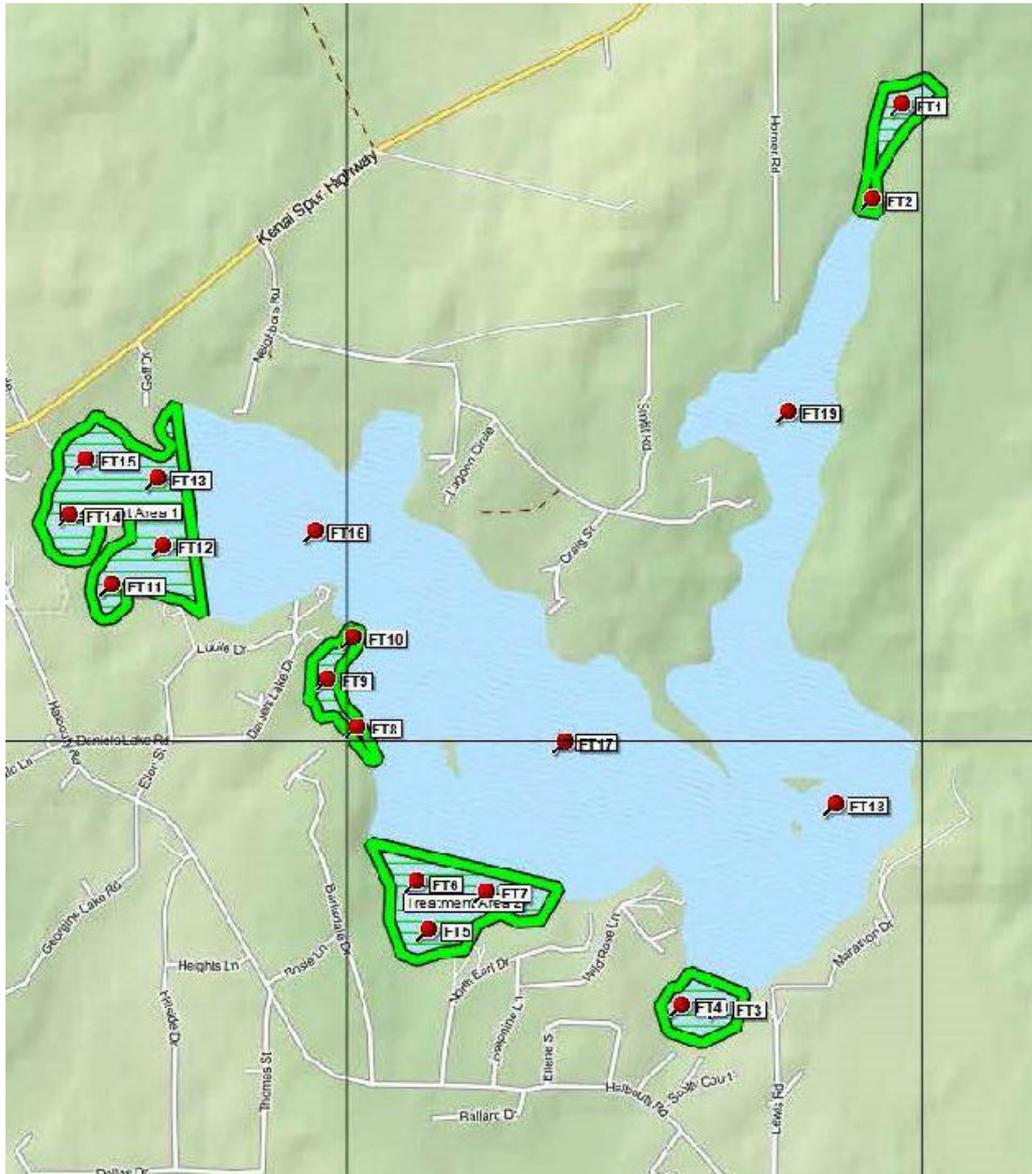




Daniels Lake requires partial-lake treatment

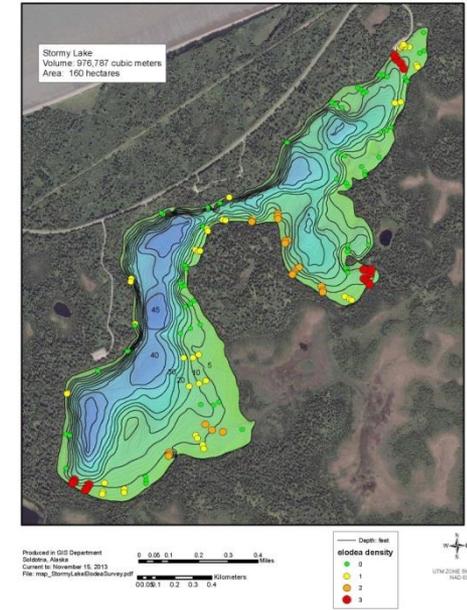
Produced in GIS Department
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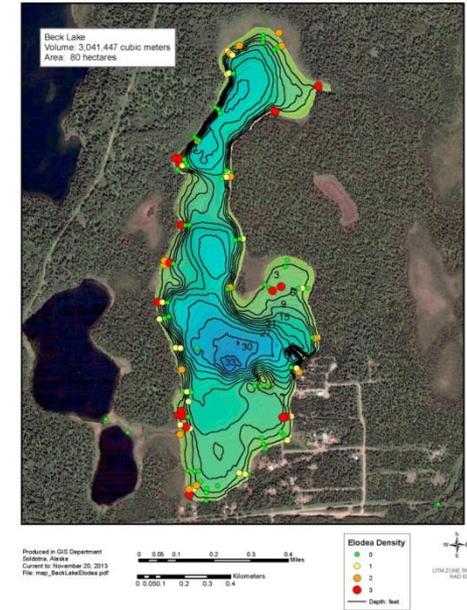
5 treatment sites on Daniels Lake

Stormy Lake prescription



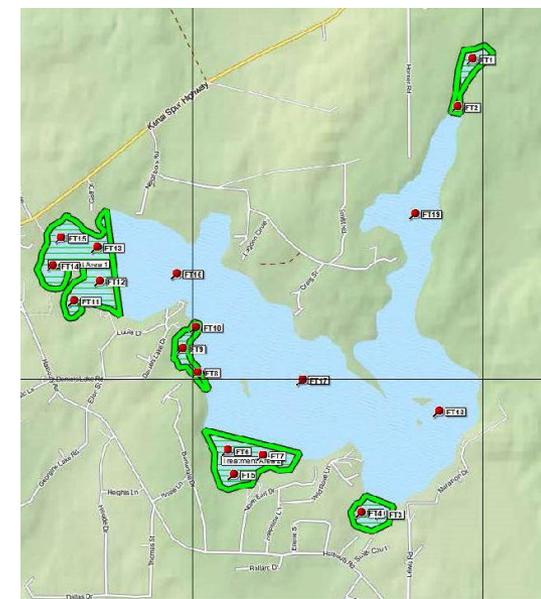
STORMY LAKE (395.1 acres, mean depth = 17.6 ft, volume = 6,936 acre-ft)								
TREATMENT		PRESCRIPTION						COST
No.	Target Date	Sonar Genesis®			SonarONE®			
		ppb	gal	\$	ppb	lbs	\$	
1	June 2014	8	300	77,000	6	2247	63,000	\$140,000
2	Sept 2014				4	1498	42,000	\$42,000
3	June 2015				8	2996	84,000	\$84,000
4	June 2016				6	2247	63,000	\$63,000
Σ			300			8989		\$329,000

Beck Lake prescription



BECK LAKE (196.8 acres, mean depth = 12.5 ft, volume = 2,466 acre-ft)								
TREATMENT		PRESCRIPTION						COST
No.	Target Date	Sonar Genesis®			SonarONE®			
		ppb	gal	\$	ppb	lbs	\$	
1	June 2014	8	107	27,400	6	799	22,400	\$49,800
2	Sept 2014				4	533	14,950	\$14,900
3	June 2015				8	1065	29,900	\$29,900
4	June 2016				6	799	22,400	\$22,400
Σ			107			3196		\$117,000

Daniels Lake prescription



PARTIAL LAKE TREATMENTS					SonarONE® PRESCRIPTIONS								
					June 2014		Sept 2014		June 2015		June 2016		Σ
Treatment Area	Acres	Depth (ft)	Mean volume (ac-ft)	% lake volume	ppb	lbs	ppb	lbs	ppb	lbs	ppb	lbs	
1	52.1	8	416.8	3.8	60	1350	30	675	30	675	30	675	3375
2	29.1	5	145.5	1.3	60	471	30	236	30	236	30	236	1179
3	10.1	4	40.4	0.4	90	196	45	98	45	98	45	98	490
4	9.2	3	27.6	0.3	90	134	45	67	45	67	45	67	335
5	8.0	8	64.0	0.6	90	311	45	156	45	156	45	156	779
TOTAL PRODUCT (lbs)						2,151		1,076		1,076		1,076	6,158
COST						\$69,100		\$34,500		\$34,500		\$34,500	\$172,600
Theoretical lake-wide concentration (ppb)						4.21		2.10		2.10		2.10	
Theoretical in-water concentration (ppb)						2.52		1.26		1.26		1.26	

Sampling design for assessing fluridone concentrations in the water column

Lake	FasTEST Site	15-Jun	1-Jul	1-Aug	1-Sep	1-Oct	Latitude	Longitude
		2 WAT	4 WAT	8 WAT	12 WAT	16 WAT		
Daniels Lake	1	X	X	X	X	X	60.7516372	-151.167864
Daniels Lake	2	X	X				60.7489173	-151.169602
Daniels Lake	3	X	X	X	X	X	60.7255421	-151.1783782
Daniels Lake	4	X	X				60.7256261	-151.1806742
Daniels Lake	5	X	X				60.727812	-151.1953083
Daniels Lake	6	X	X	X	X	X	60.7291887	-151.1959735
Daniels Lake	7	X	X				60.728905	-151.1919609
Daniels Lake	8	X	X				60.7336754	-151.1994711
Daniels Lake	9	X	X	X	X	X	60.7350518	-151.2011555
Daniels Lake	10	X	X				60.7362653	-151.199675
Daniels Lake	11	X	X				60.7377676	-151.2136654
Daniels Lake	12	X	X	X	X	X	60.7389127	-151.2107042
Daniels Lake	13	X	X				60.7408561	-151.2110261
Daniels Lake	14	X	X				60.7397951	-151.2160472
Daniels Lake	15	X	X	X	X	X	60.7413813	-151.2151459
Daniels Lake	16	X	X				60.733263	-151.1874602
Daniels Lake	17	X	X	X	X	X	60.7314558	-151.1717532
Daniels Lake	18	X	X				60.742802	-151.1744997
Daniels Lake	19	X	X				60.7393565	-151.2018797
Beck Lake	1	X	X	X	X	X	60.7408472	-151.1300189
Beck Lake	2	X	X				60.7378211	-151.1344396
Beck Lake	3	X	X	X	X	X	60.7336602	-151.1353409
Beck Lake	4	X	X				60.7325465	-151.128903
Beck Lake	5	X	X				60.7300037	-151.1332379
Beck Lake	6	X	X	X	X	X	60.7263682	-151.134783
Stormy Lake	1	X	X				60.7874167	-151.0327008
Stormy Lake	2	X	X	X	X	X	60.7840311	-151.0400868
Stormy Lake	3	X	X				60.7797427	-151.0402846
Stormy Lake	4	X	X	X	X	X	60.7794847	-151.0560459
Stormy Lake	5	X	X				60.7716495	-151.0532762
Stormy Lake	6	X	X	X	X	X	60.7696181	-151.0627725
Total Samples		31	31	13	13	13		
Grand Total		101						

Total cost for fluridone is \$600K for 4 treatments over 3 years

Annual Fluridone Treatments and Product Costs to Eradicate Elodea from Kenai Peninsula								
LAKE	2014		2015		2016		TOTAL	
	ppb	\$	ppb	\$	ppb	\$	ppb	\$
Beck	18	64,700	8	29,900	6	22,400	32	117,000
Stormy	18	182,100	8	84,000	6	63,000	32	329,100
Daniels	5.51	90,500	1.84	30,200	1.84	30,200	9	150,900
Σ		337,300		144,100		115,600		597,000

Funds received to date

Receiving Office	Funds Rec'd	Funding Source	Purpose
Kenai Fisheries Office (USFWS)	\$28K	National Fish Habitat Action Plan	Survey peninsula lakes
Kenai National Wildlife Refuge (USFWS)	\$20K	USFWS R7 Invasive Species Management with Volunteers	Survey peninsula lakes
Kenai National Wildlife Refuge (USFWS)	\$40K	Kenai Peninsula Borough	Support treatments
Kenai National Wildlife Refuge (USFWS)	\$40K	National Fish and Wildlife Foundation	Support treatments
Kenai Fisheries Office (USFWS)	\$35K	USFWS R7 Aquatic Invasive Species Program	Non-target effects study
Kenai National Wildlife Refuge (USFWS)	\$120K	USFWS R7 Invasive Species Management with Volunteers	Support treatments
Kenai Peninsula Borough	\$400K??	State Legislature	Support treatments

However, timing of funding has slightly changed prescriptions...

- ✓ 1st treatment of Beck Lake (Genesis, SonarONE) in **June**
- ✓ 1st treatment of Daniels Lake (**Diquat**, SonarONE) in **June**
- ✓ 1st treatment of Stormy Lake (Genesis, SonarONE) in **July**
- ✓ 2nd treatments of all 3 lakes (SonarONE) in September

- Keep Stormy Lake closed to boat access for 2nd summer in 2014
- Continued public outreach

Application equipment



Pellet blower for SonarONE



Pump for Sonar Genesis

Nets at lake outlets



IX. ADMINISTRATIVE RECORD

Sep 2012	Elodea detected in Stormy Lake
Oct 2012	Elodea detected in Daniels Lake
Feb 2013	1 st public landowner meeting in Nikiski Preliminary survey of Daniels Lake
Mar 2013	1 st face-to-face meeting of Elodea technical working group
Apr 2013	DEC permit application submitted for Diquat Live elodea samples sent to SePRO
May 2013	DEC permit application submitted for Fluridone Enhanced survey of Daniels Lake Presentation/petition to KPB Assembly
Jun 2013	Begin surveys of other lakes on the Kenai Peninsula (\$55K) DEC permit to apply diquat approved (#13-AQU-01) APDES approved for Stormy, Daniels Lakes (AKG870000) \$40K received from KBP
July 2013	Elodea detected in Beck Lake
Aug 2013	EA approved (AK-DNR/USFWS)
Sep 2013	Complete survey of other lakes on the Kenai Peninsula (n=68)
Dec 2013	First draft of IPM completed
Jan 2014	\$40K received from National Fish & Wildlife Foundation
Feb 2014	DEC permit application for fluridone formally resubmitted APDES modification to include Beck Lake approved (AKG870001)
Mar 2014	2 nd face-to-face meeting of Elodea technical working group
Apr 2014	DEC permit to apply fluridone approved (#14-AQU-01) 2 nd public landowner meeting in Nikiski 2-hr special session at KP-CWMA annual conference \$155K (2 grants) received from USFWS
May 2014	Pre-treatment surveys
Jun 2014	1 st herbicide treatments (Diquat in Daniels Lake)

Questions???

