

# Eradicating Elodea from the Kenai Peninsula – success?

## Known Locations of Elodea in Alaska



John Morton  
Kenai National Wildlife Refuge

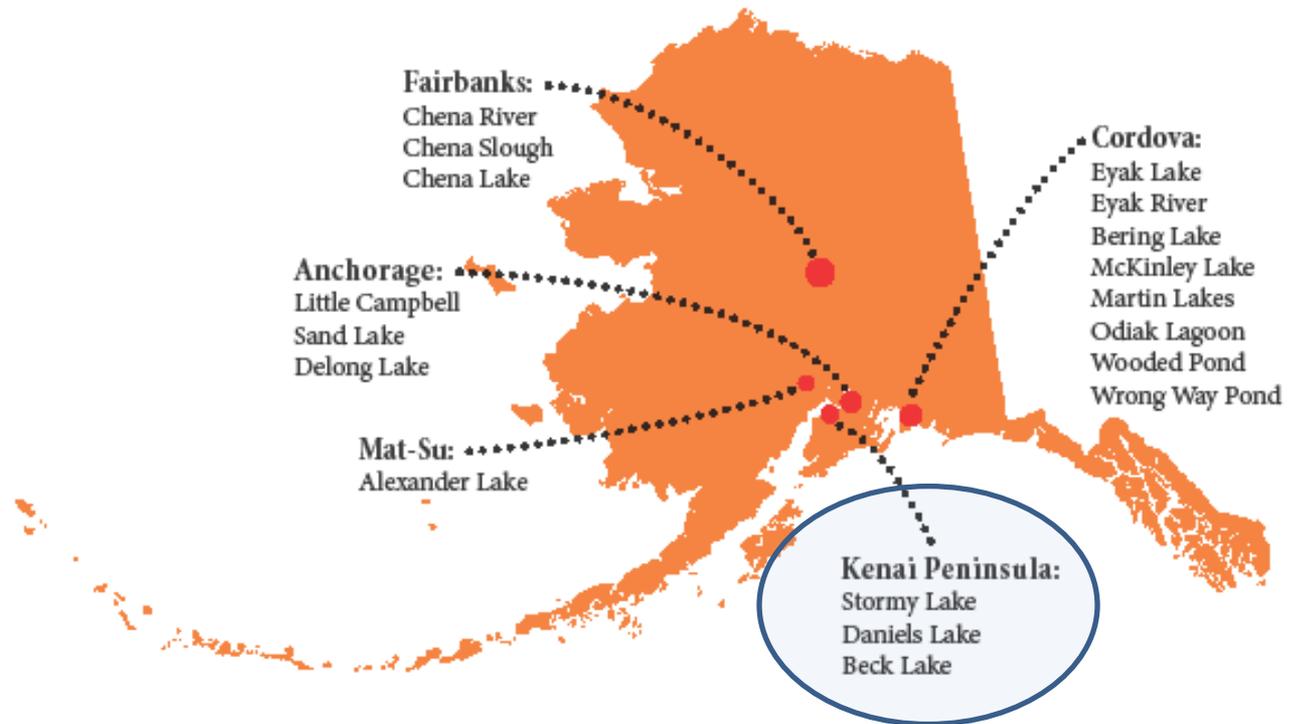


## Eyak Lake, Cordova



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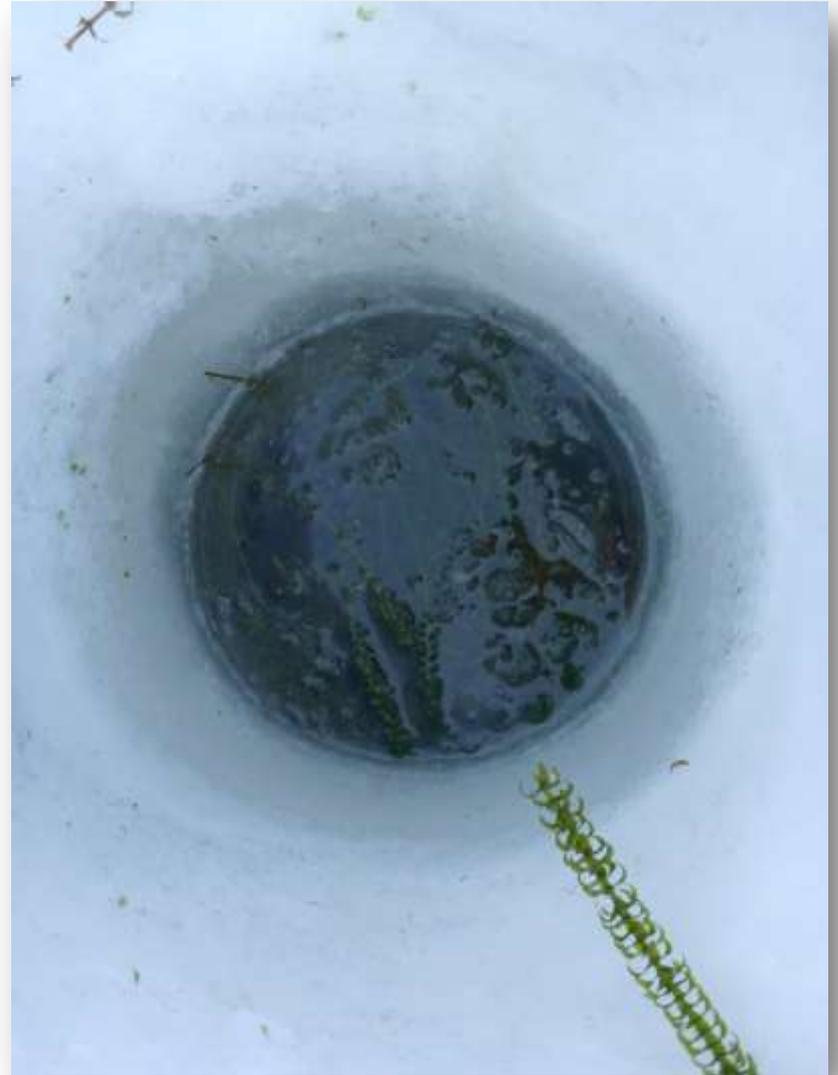
# Sport Lake, Soldotna



# Elodea was recognized early as bad...

- ✓ It's prolific!
- ✓ Reproduces vegetatively
- ✓ Spreads easily
- ✓ Grows under the ice
- ✓ Severely impairs fish habitat
- ✓ Anoxic conditions in extreme cases
- ✓ Impedes boat traffic
- ✓ Reduces property values





# Community Elodea Information Meeting

Nikiski Community Recreation Center  
Mile 23.4 Kenai Spur Highway

Tuesday February 19<sup>th</sup>, 2013  
6 - 8:30PM

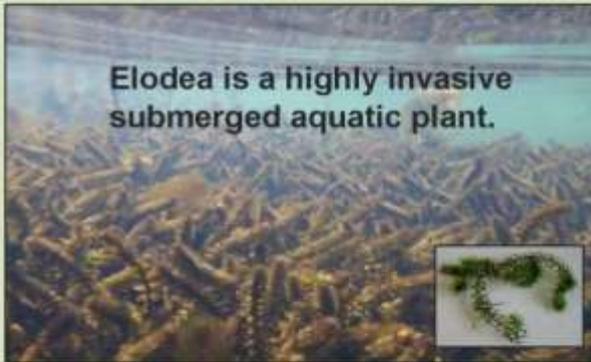


Please join us for a community meeting to discuss what to do about the discovery of Elodea in Stormy & Daniels Lakes.

Dr. Lars Anderson (USDA Agricultural Research Service and University of California-Davis), an aquatic invasive plant expert, will be at the meeting to provide information about Elodea, discuss options for management, and share his experiences in coping with aquatic infestations.

Elodea is not native to the Kenai Peninsula, and can cause serious, irreversible harm to fish and aquatic habitats if allowed to spread unchecked.

Elodea presence has recently been confirmed in Stormy and Daniels Lake on the Kenai Peninsula, and in some slow-moving waters in Anchorage, Fairbanks, and Cordova.



**Meeting Open to the Public**  
For more information, please contact Janice Chumley at UAF-Cooperative Extensive Service, 907-262-5824

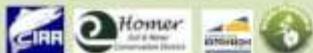
## Why we don't want Elodea

**Nuisance:** impedes boat and float plane launching, navigation, and fishing

**Ecological:** degrades salmon spawning habitat

**Safety:** fouls float plane rudders and boat propellers

**Economic:** reduces property values by fouling launch sites and shore habitats



# INTEGRATED PEST MANAGEMENT PLAN FOR ERADICATING ELODEA FROM THE KENAI PENINSULA

April 2014

Prepared by

Elodea Subcommittee of the Kenai Peninsula Cooperative Weed Management Area

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Brianna N. Blackburn (AK Department of Natural Resources, Palmer)  
Elizabeth Bella (USFWS Kenai National Wildlife Refuge, Soldotna)  
Matt Steffy (Homer Soil & Water Conservation District, Homer)  
Cheryl Anderson (USFWS Kenai Fish & Wildlife Field Office, Soldotna)  
Rob Massengill (Alaska Department of Fish and Game, Soldotna)  
Jack Blackwell (AK State Parks, Soldotna)  
Lisa Ka'aihue (Cook Inlet Aquaculture Association, Kenai)  
Rebecca Zulueta (Kenai Watershed Forum, Soldotna)  
Janice Chumley (UAF Cooperative Extension Service, Soldotna)  
Michele Aranquiz (Kenai Peninsula Borough Mayor's Office, Soldotna)  
Cecil Rich (USFWS Regional Office, Anchorage)

**In consultation with:**

Lars Anderson (Waterweed Solutions, Davis)  
Donald H. Les (University of Connecticut, Storrs)  
Scott Schuler (SePRO Corporation, Carmel, IN)  
Andrew Skibo (SePRO Corporation, Fort Collins, CO)

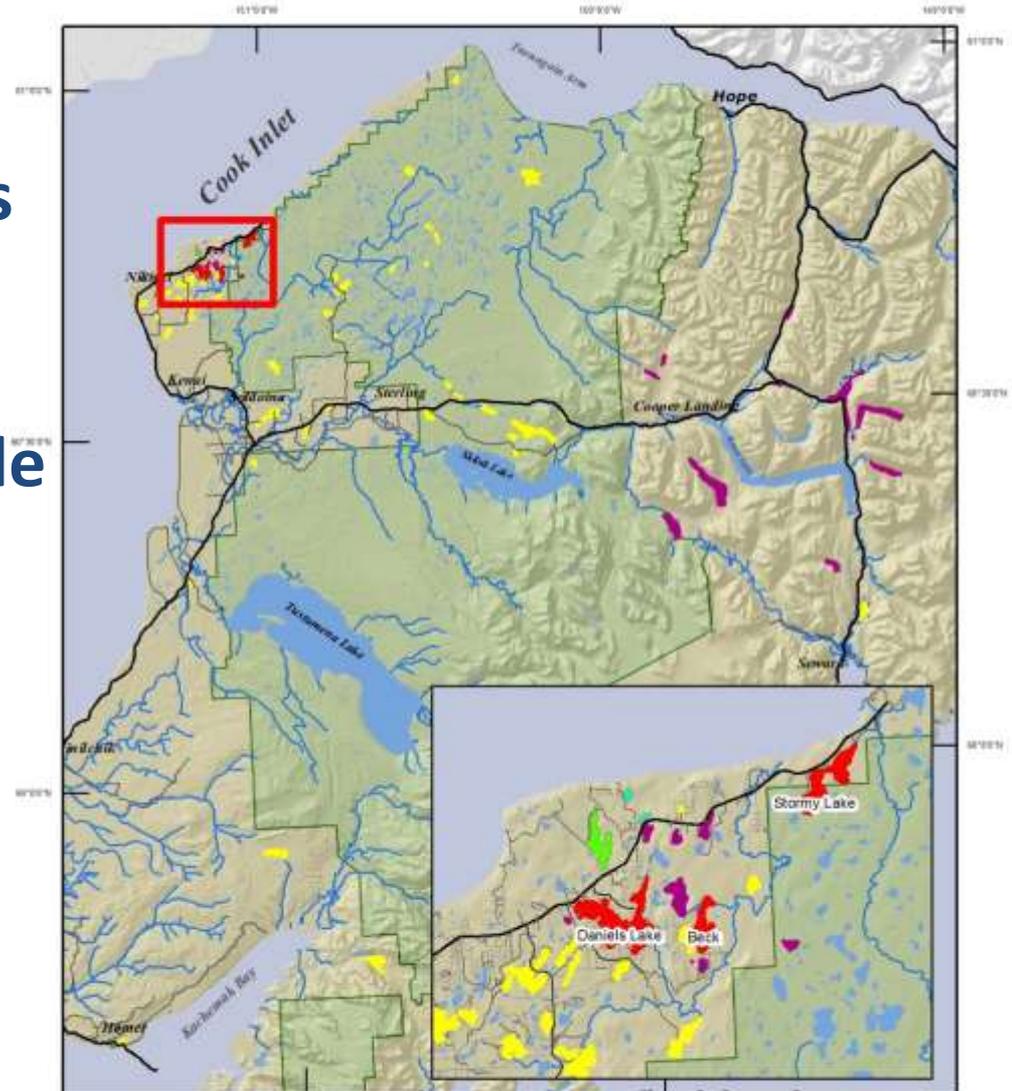


**Cooperative Weed  
Management Area**





Surveyed 100+ at-risk lakes before (and during) treatment to assess feasibility of peninsula-wide eradication...

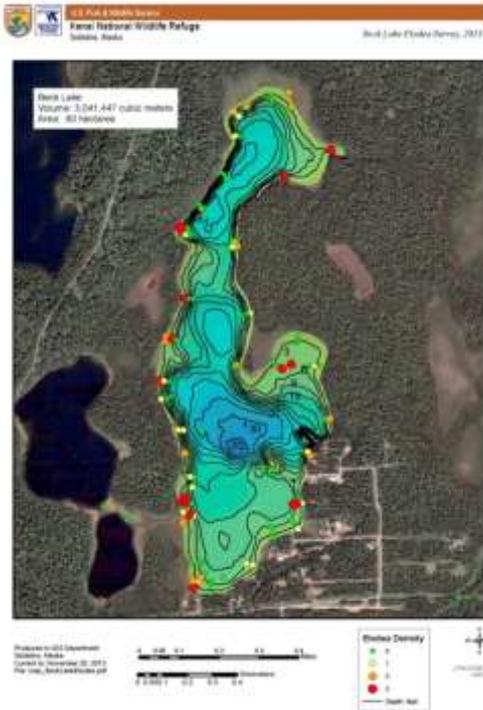


Produced in GIS Department  
Soldotna, Alaska  
Current to: 08/11/2016

0 5 10 20 Miles

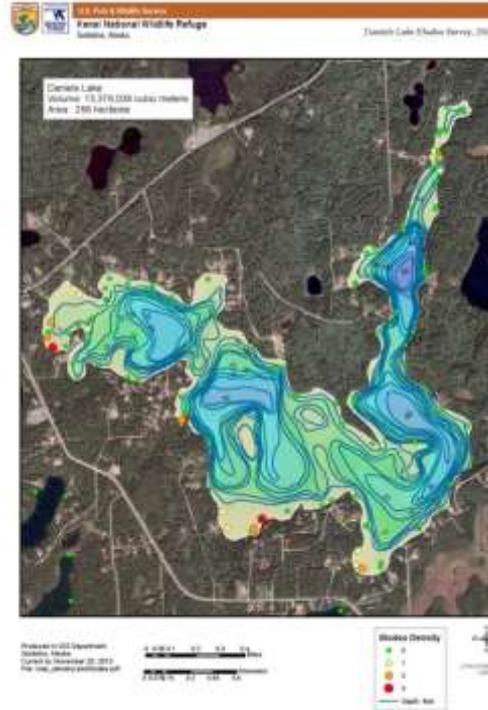


## Beck Lake (200 ac) whole treatment



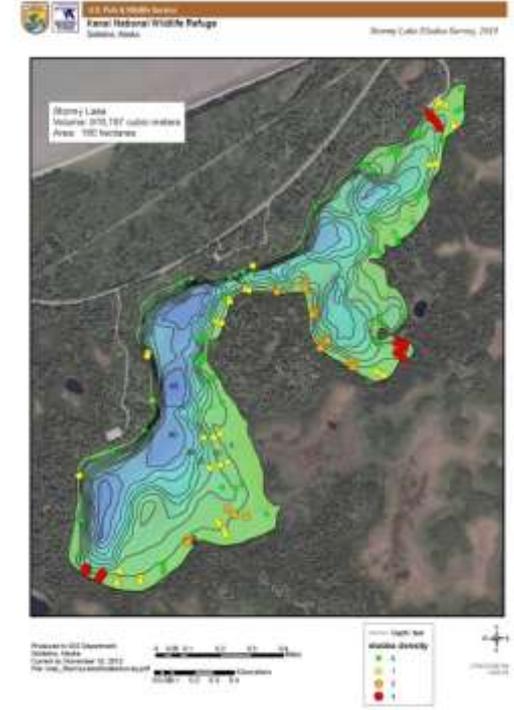
- Some private landowners
- Floatplanes
- NO public access
- Flows into Bishop Creek
- Rainbow trout

## Daniels Lake (640 ac) partial treatment

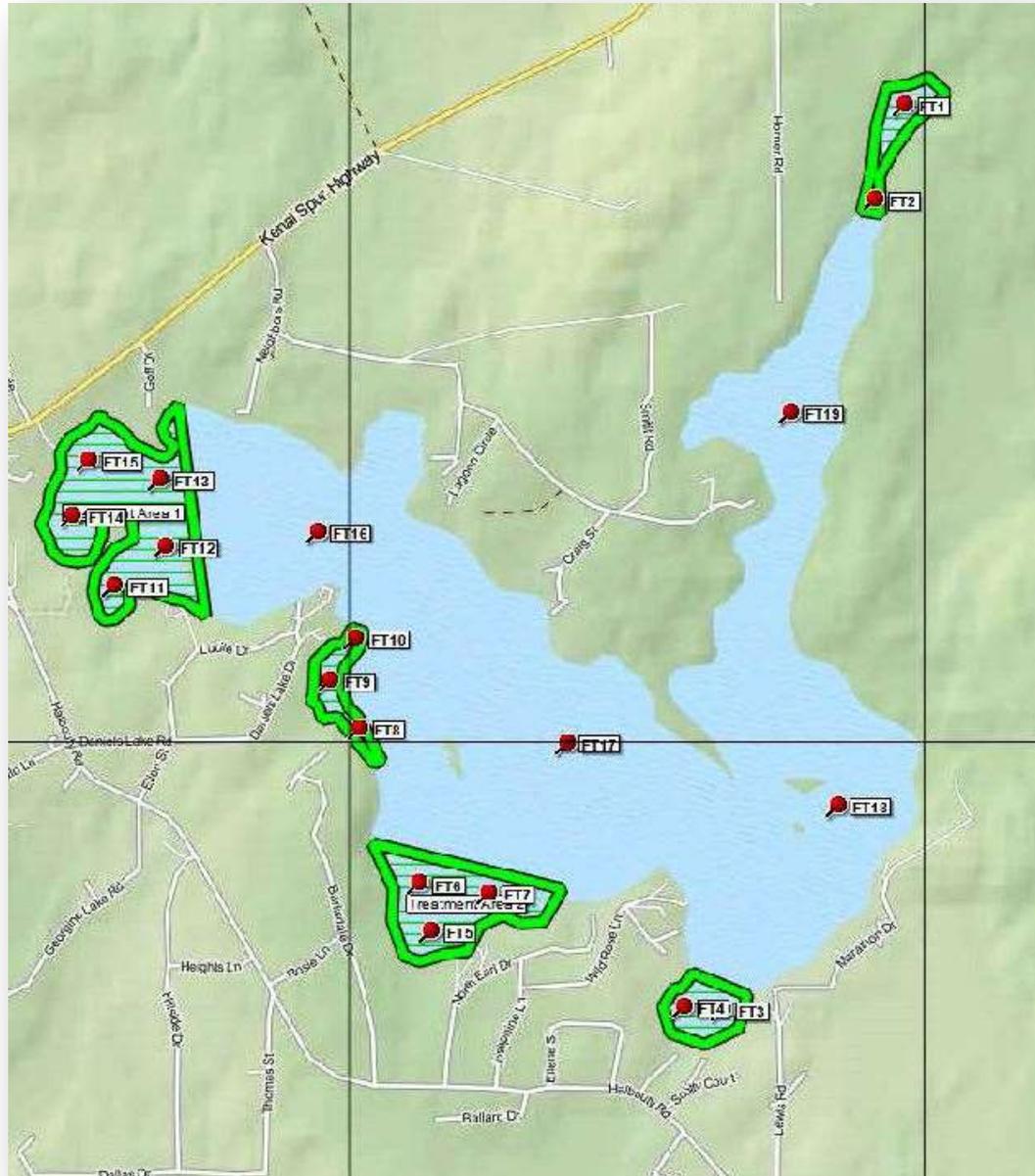


- All private landowners
- Floatplanes
- 1 community boat launch
- Flows into Bishop Creek
- Sockeye salmon

## Stormy Lake (400 ac) whole treatment



- State Parks/KENWR
- 1 public boat launch
- Flows into Swanson River
- Arctic char



## 5 treatment sites on Daniels Lake

**Red** dots = 19 FasTEST sites

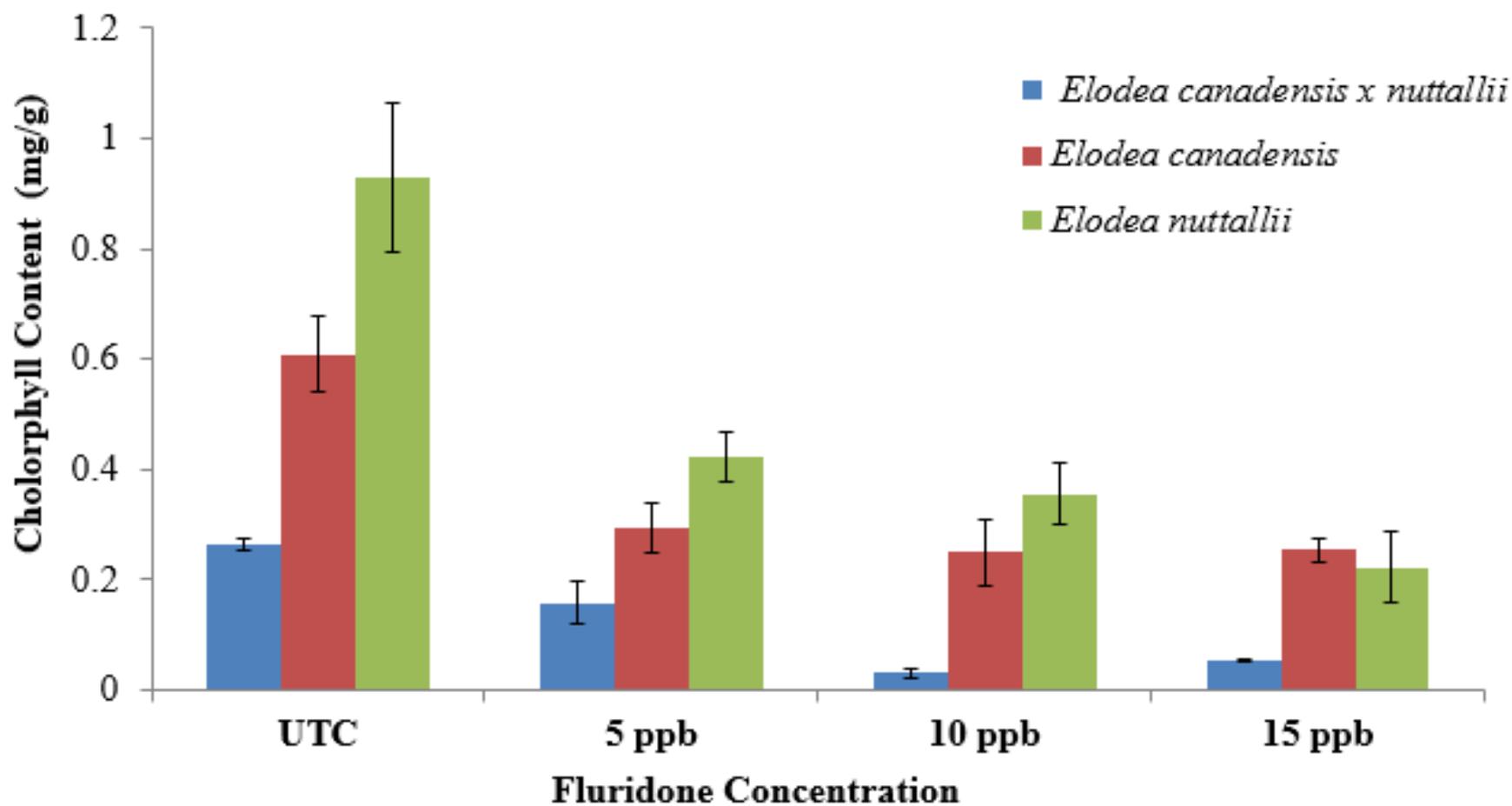
# Fluridone kills elodea systemically and selectively with few nontarget effects

- ✓ Absorbed through roots and shoots (systemic)
- ✓ Inhibits carotenoid synthesis (photosynthesis) and elodea is particularly sensitive (selective)
- ✓ Applied as liquid or slow-release pellets
- ✓ Degrades by photolysis, adsorption, absorption
- ✓ No restrictions on swimming, drinking or fishing
- ✓ Minimal irrigation precautions
- ✓ Needs to be in water column for 45 – 90 days





### Sonar® PlanTEST™ of Elodea Congener Chlorophyll Response to Fluridone Exposure 28 DAT



Diquat (**\$9K**) also applied in June 2014 to prevent Daniels Lake transitioning from 100-acre partial lake to 660-acre whole lake treatment

Daniels Lake (partial treatment) Reward® Diquat bromide		
Treatment Area	acres	gal
1	52.1	47
2	29.1	29
3	10.1	10
4	9.2	8
5	8.0	7
<b>Σ</b>	<b>108.5</b>	<b>101</b>



## Four herbicide treatments over three years (2014-16) to eradicate elodea

	Beck	Stormy	Daniels	Cost
acres	200	400	660 (100)	
approach	WHOLE	WHOLE	PARTIAL	
June 2014	liquid/pellet fluridone	liquid/pellet fluridone	<b>diquat</b> pellet	\$360k
Sept 2014	pellet	pellet	pellet	
June 2015	pellet	pellet	pellet	\$144k
June 2016	pellet	pellet	pellet	\$116k
cost	\$113K	\$320K	\$197K	<b>\$620K</b>

# Application equipment



Pellet blower for SonarONE



Pump for Sonar Genesis, Diquat

# Nets at lake outlets







USFWS  
BOATING  
INSTRUCTOR

**MAGNUM**  
River and Sea

HONDA  
35  
50



16 SPORTSMAN

AK 8821AG



SOG

naph

5.0



MOB

ZOUT

ZIN

EXIT

ENTER

MENU

PAGE

WPT  
FIND

LIGHT  
POWER

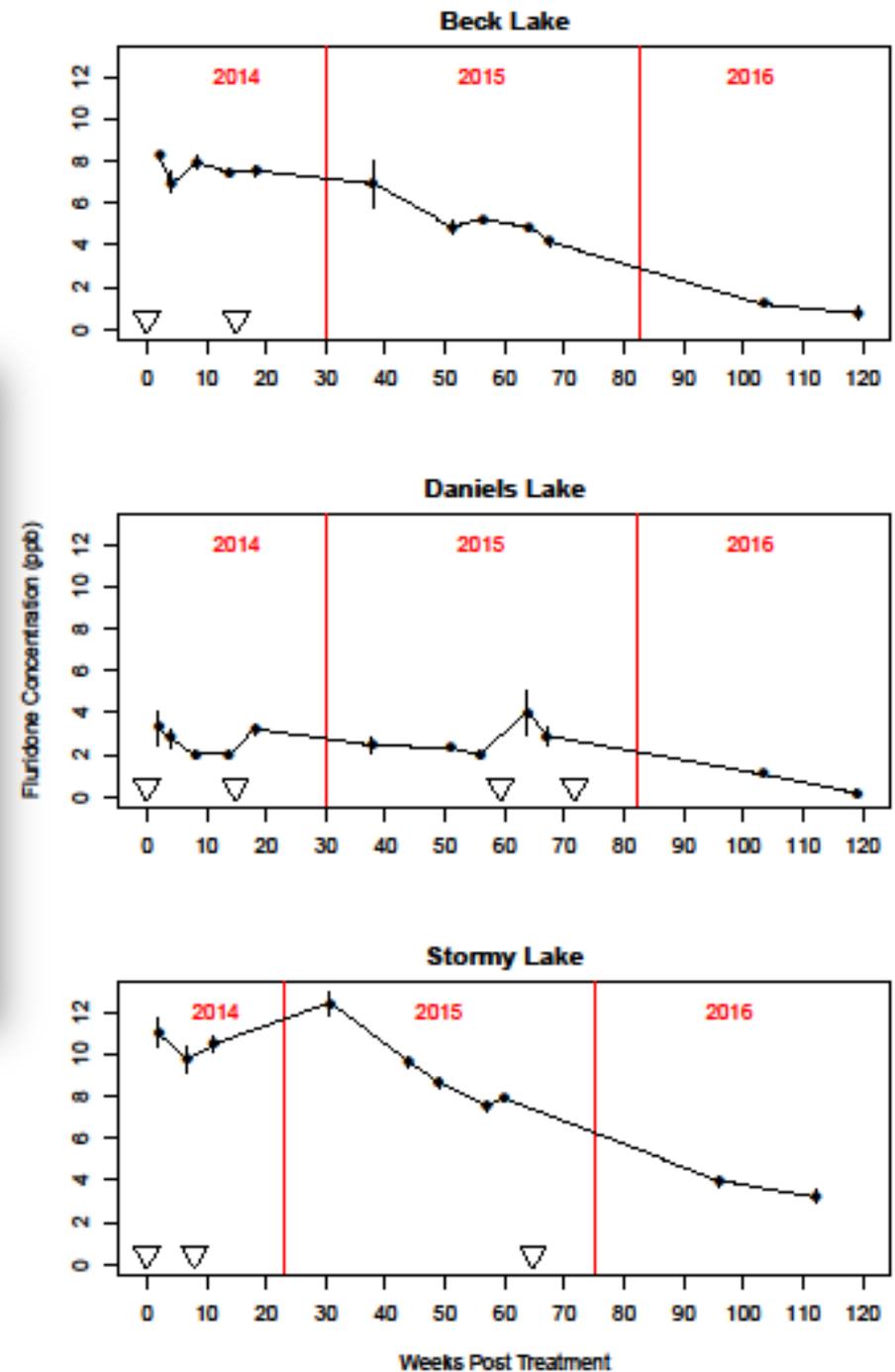
## Sampling design to assess fluridone concentrations in water column

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
<b>Total Samples</b>		<b>31</b>	<b>31</b>	<b>13</b>	<b>13</b>	<b>13</b>		
<b>Grand Total</b>		<b>101</b>						

# Is it working?



- 1<sup>st</sup> application (Beck, Daniels) 3-4 Jun 14
- 1<sup>st</sup> application (Stormy) 23 Jul 14
- 2<sup>nd</sup> application (Beck, Daniels, Stormy) 16-17 Sep 14
- 3<sup>rd</sup> application (Daniels) 24 Jul 15
- 4<sup>th</sup> application (Daniels) 19 Oct 15



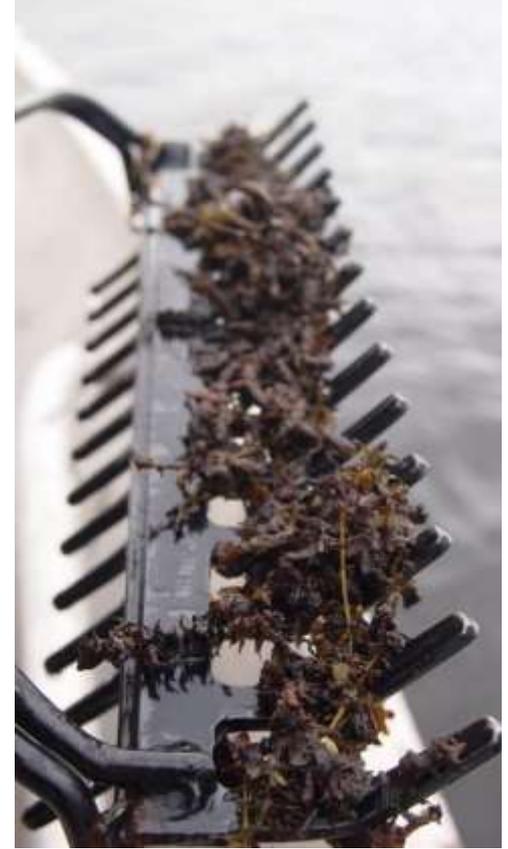
# Is it working?



2 weeks (Stormy)

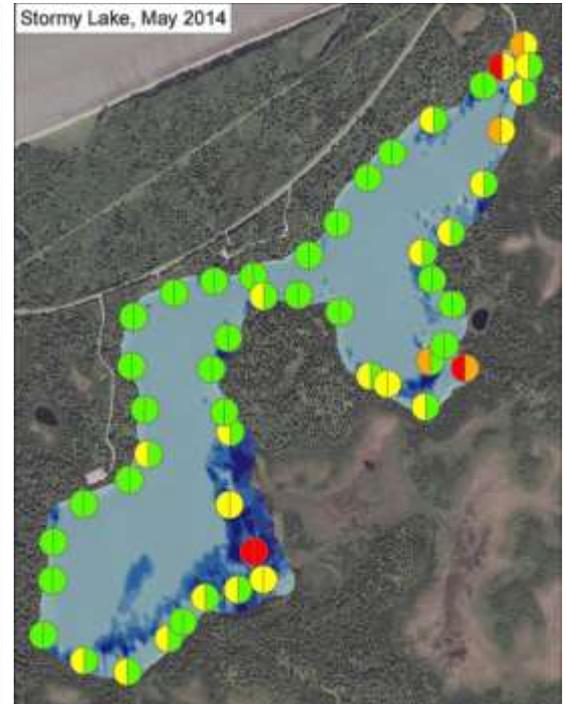
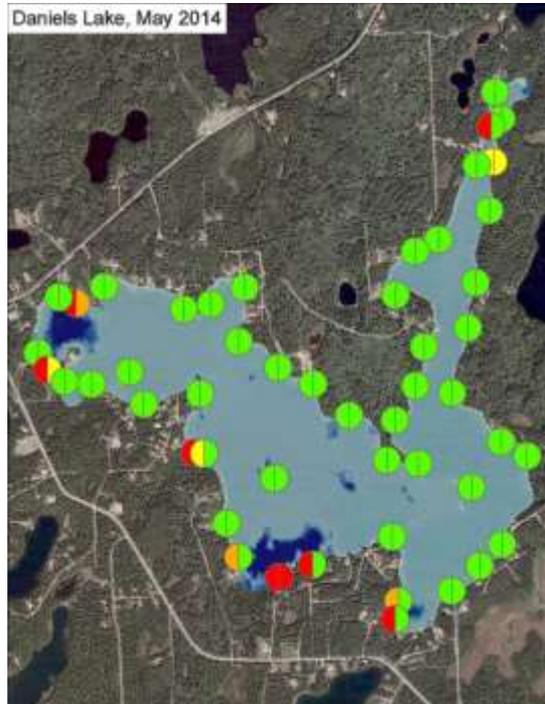


8 weeks (Beck)



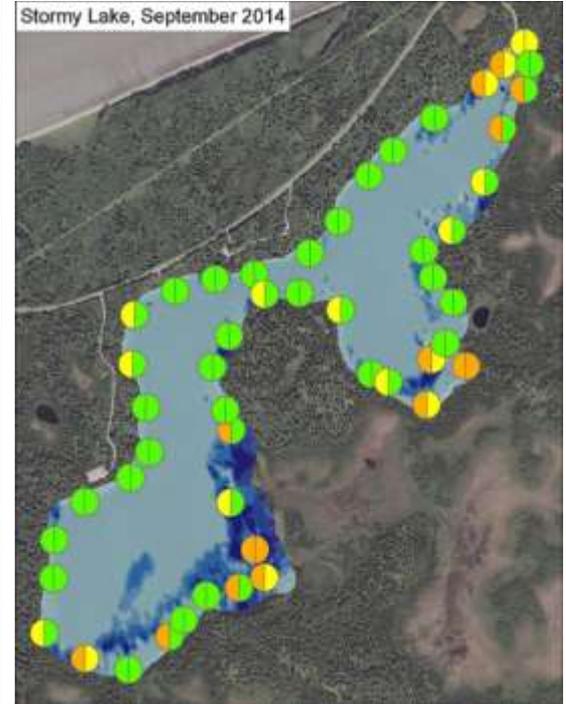
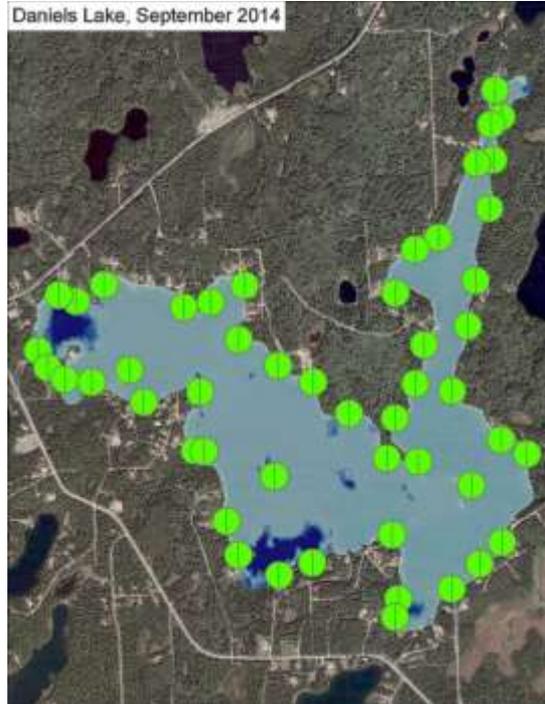
14 weeks (Beck)

# Is it working?



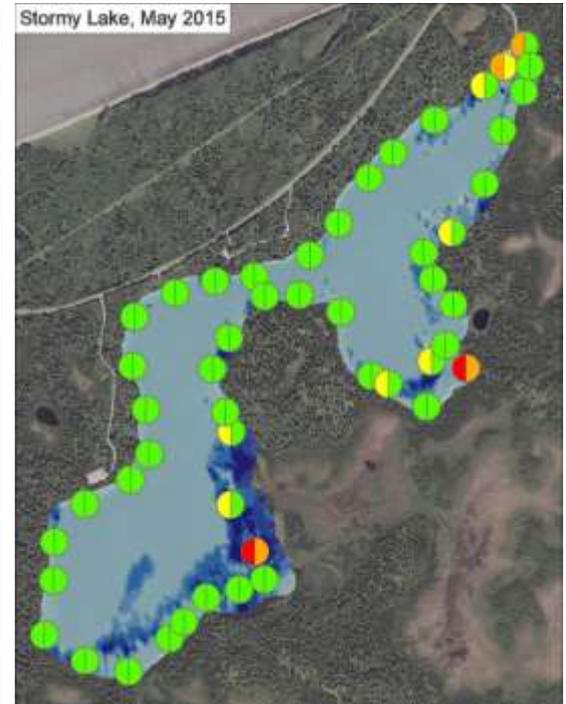
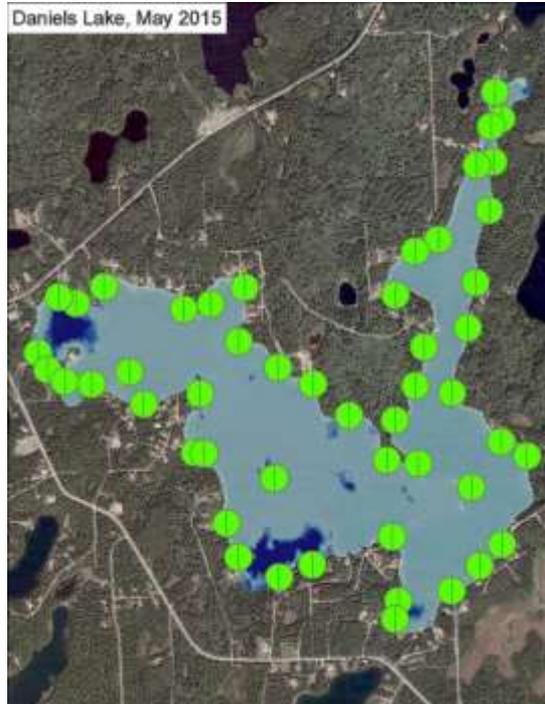
SURVEY	LAKE		
	Beck	Daniels	Stormy
May 2014 (pre-trmt )	<b>70</b>	<b>22</b>	<b>50</b>

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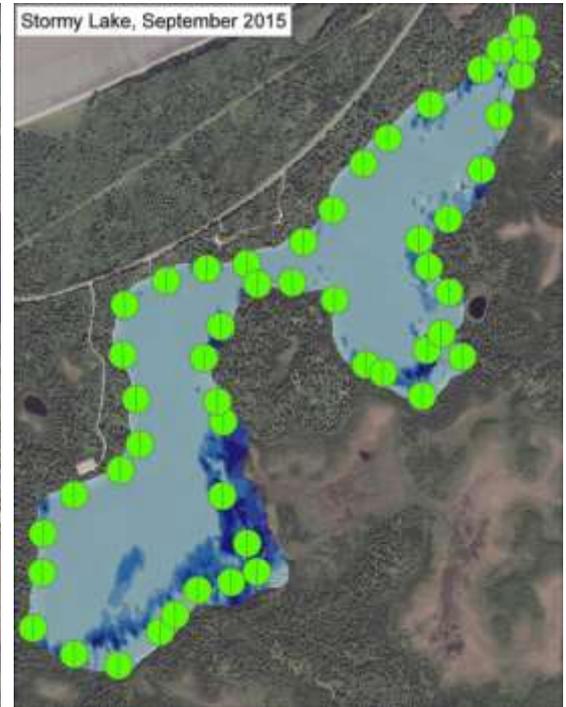
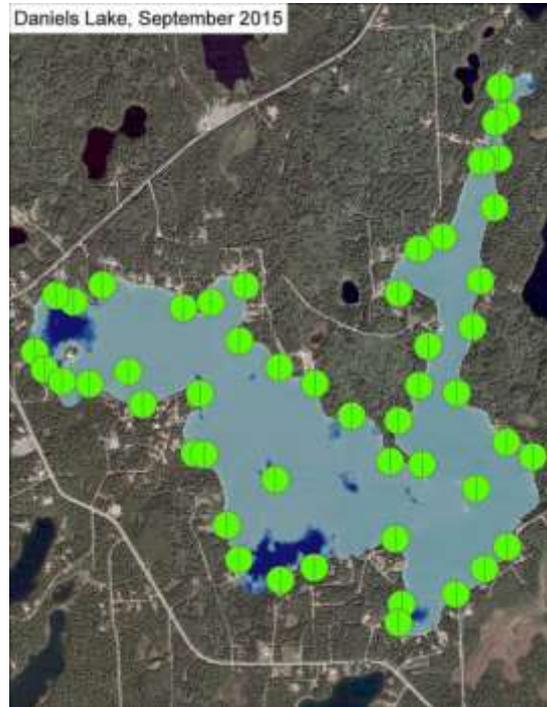
SURVEY	LAKE		
	Beck	Daniels	Stormy
May 2014 (pre-trmt )	70	22	50
Sept 2014 (post)	<b>12</b>	<b>0</b>	<b>46</b>

# Is it working?



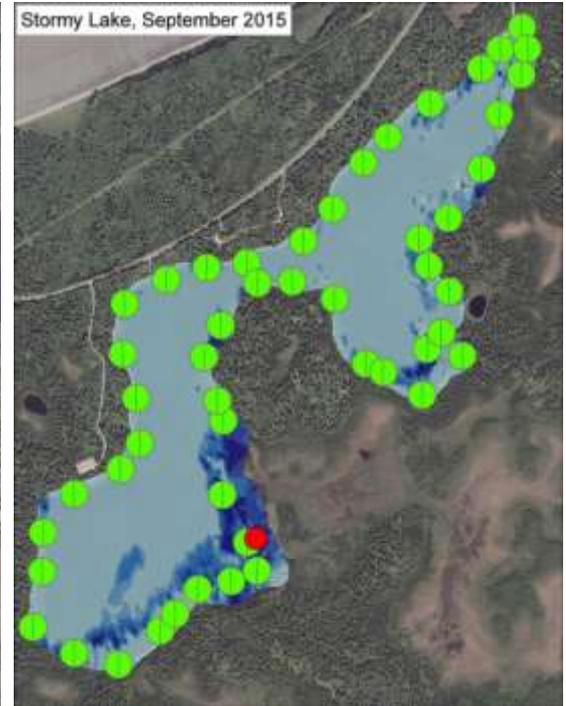
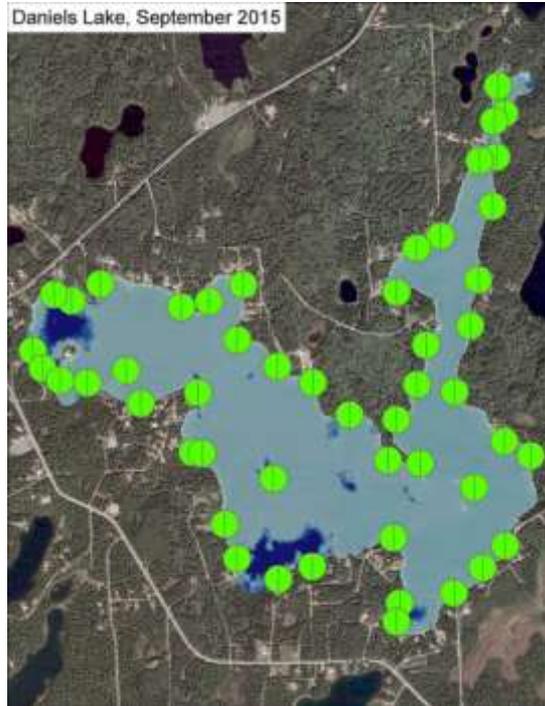
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	Beck	Daniels	Stormy
May 2014 (pre-trmt )	70	22	50
Sept 2014 (post)	12	0	46
May 2015 (post)	<b>0</b>	<b>0</b>	<b>20</b>

# Is it working?



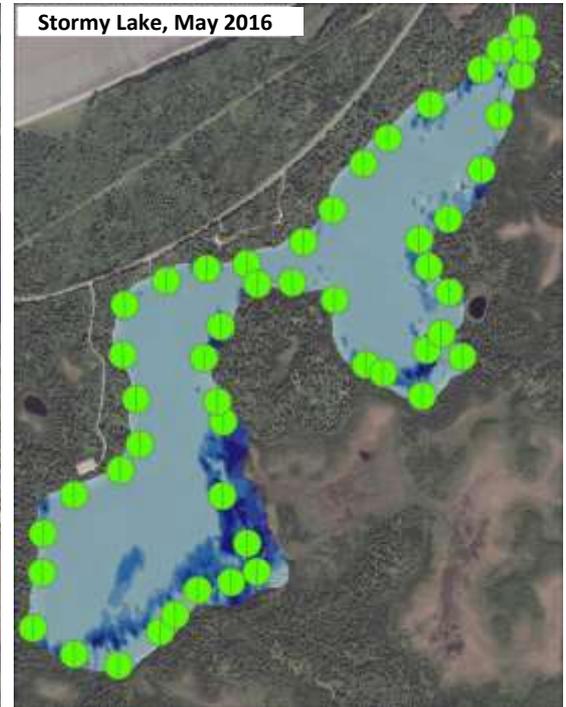
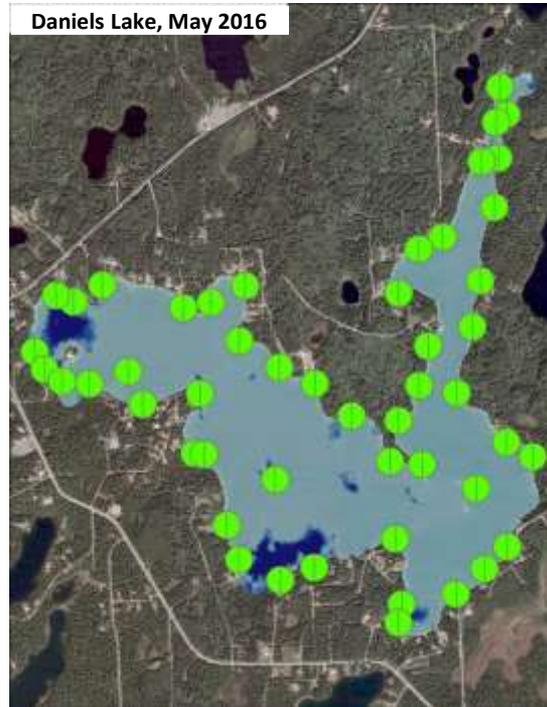
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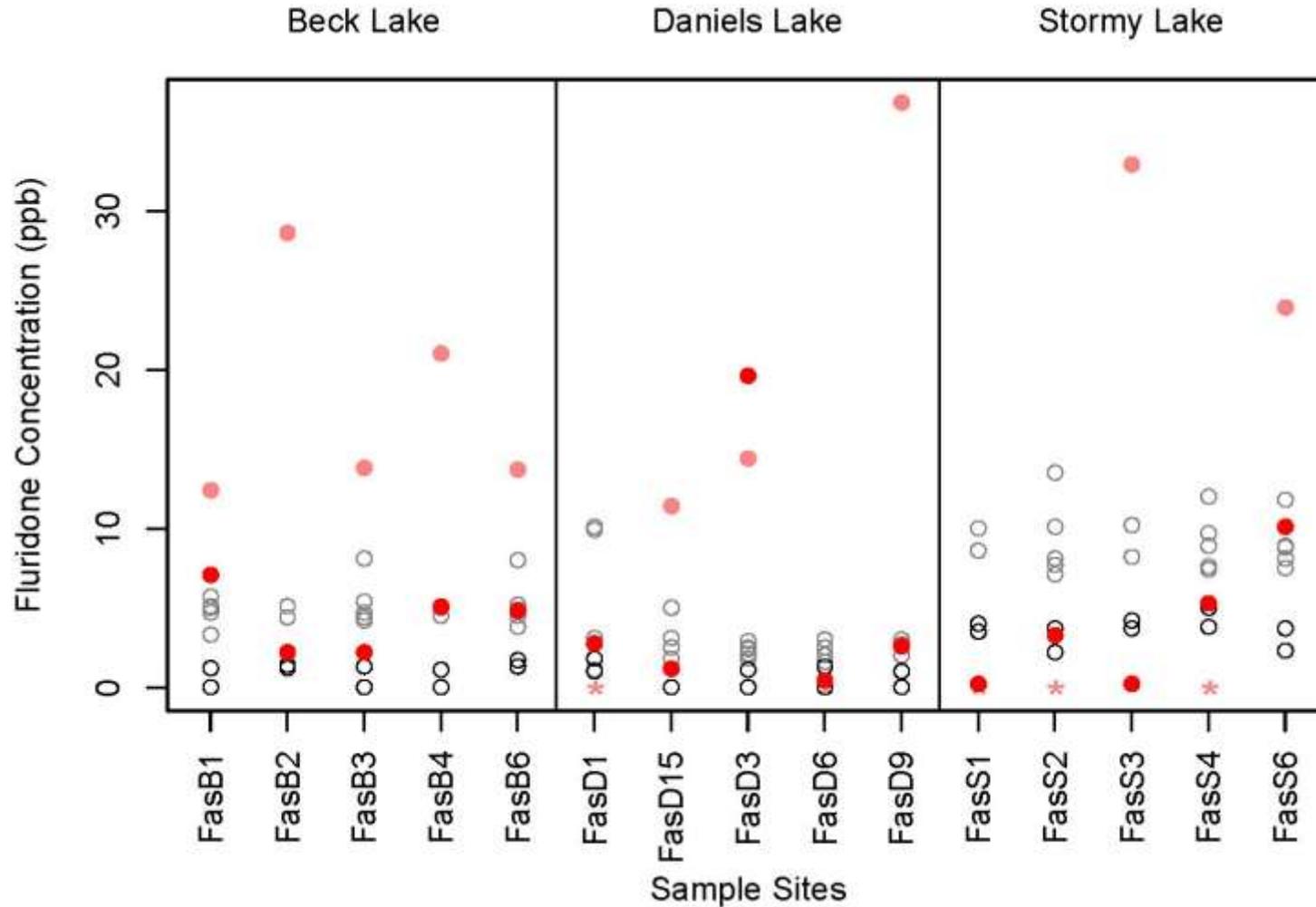


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May 2015 (post)	0	0	20
Sept 2015 (post)	0	0	0*
May 2016 (post)	<b>0</b>	<b>0</b>	<b>0</b>

# Does fluridone persist in sediment?

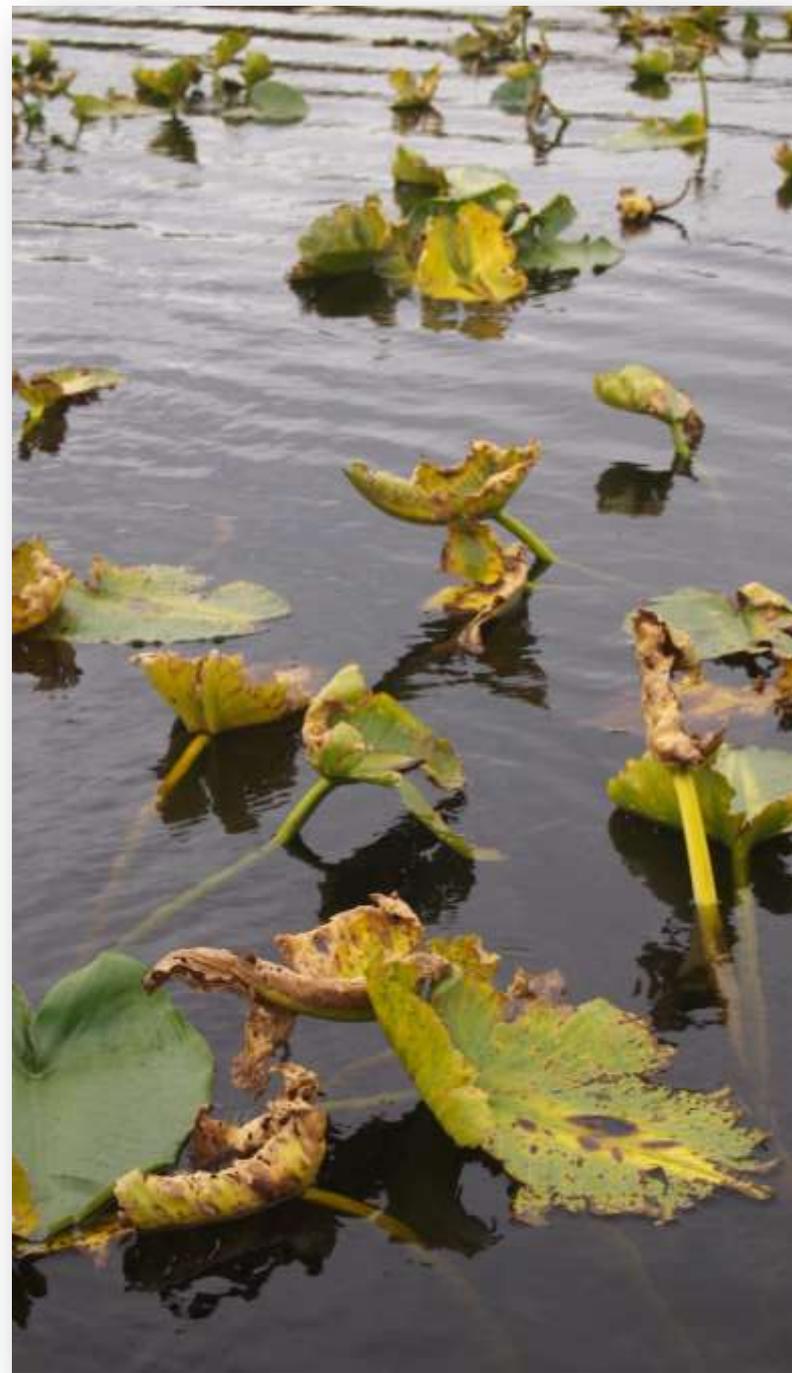


# Does fluridone persist in sediment?



\*no detect, 2015 avg = 13.9, 2016 avg = 4.5

## Some necrosis and loss of non-target plants



# Management Milestones

1<sup>st</sup> detection in Alaska

1982

Eyak Lake

2010

Chena Slough

2011

Chena River / Sand Lake

2012

Little Campbell / Delong  
McKinley / Wrong Way / Stormy / Daniels

2013

Beck Lake

2014

Alexander Lake

2015

Lake Hood  
Totchaket Slough

2016

Lars Anderson at 12<sup>th</sup> CNIPM conference

1<sup>st</sup>/<sup>2nd</sup> manual chemical treatments on Kenai

5 species quarantined in Chena Slough

DEC/DNR/ADFG MOU

1<sup>st</sup> chemical treatment of Chena Slough

3<sup>rd</sup> chemical treatment on Kenai

1<sup>st</sup> chemical treatment of Lake Hood

1<sup>st</sup> chemical treatment in Anchorage

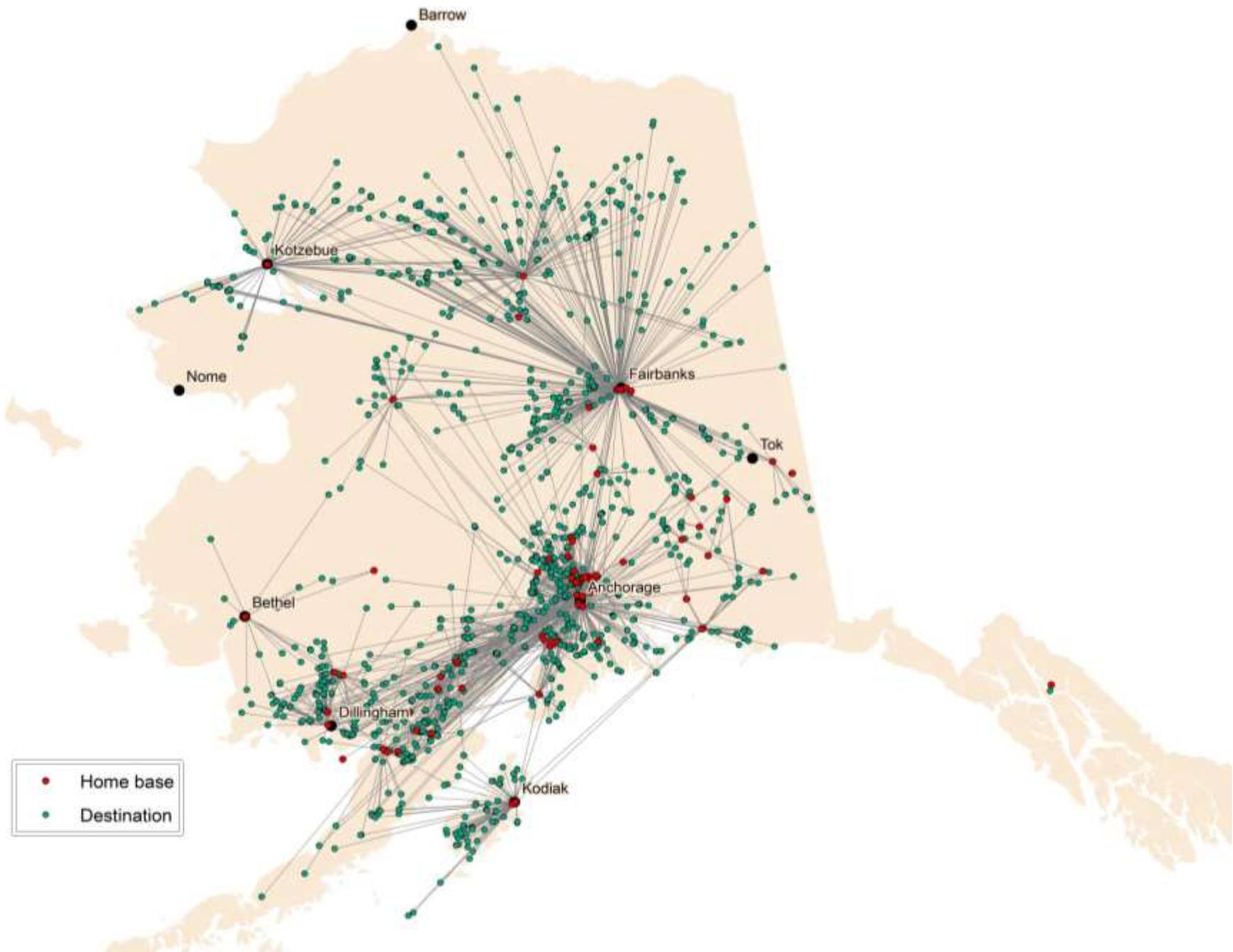
Statewide elodea strategy drafted

Elodea eradicated from Kenai?

# Spread of Elodea

# Why Kenai cares about Fairbanks.....





# Next steps in 2017

- ✓ Continued monitoring to confirm success of eradication and assess post-treatment native flora response
- ✓ Continued fluridone monitoring in water column and sediment
- ✓ Continued outreach
- ✓ Continue working with other areas in AK
- ✓ Preparing for Sport Lake







**Daniels Lake post-treatment**

**QUESTIONS??**