

# Responding rapidly to Elodea – the first freshwater invasive plant in Alaska



John Morton, Matt Bowser & Todd Eskelin  
Kenai National Wildlife Refuge



# Elodea was recognized early as bad...

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



June 2019

# Aquatic Invasive Species Change Ecosystem Services from the World's Largest Wild Sockeye Salmon Fisheries in Alaska

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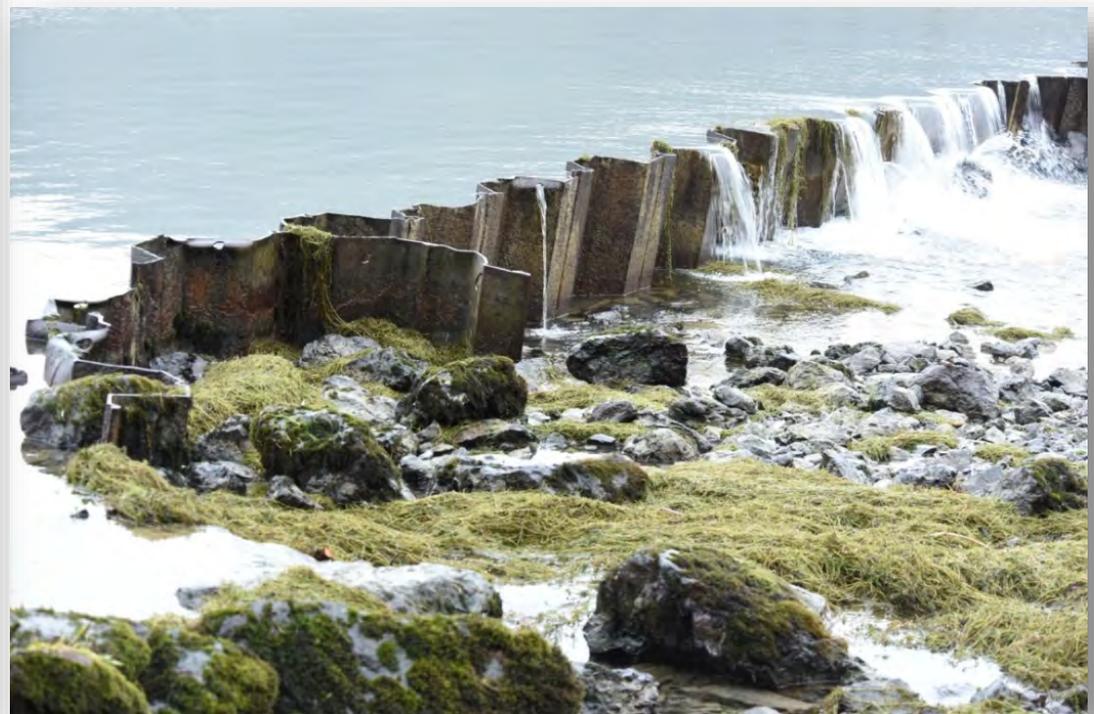
Salmon habitat degradation will likely cost statewide commercial sockeye industry ~\$152 million annually





1982

## Eyak Lake, Cordova



2015















# Community Elodea Information Meeting

Nikiski Community Recreation Center  
Mile 23.4 Kenai Spur Highway

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

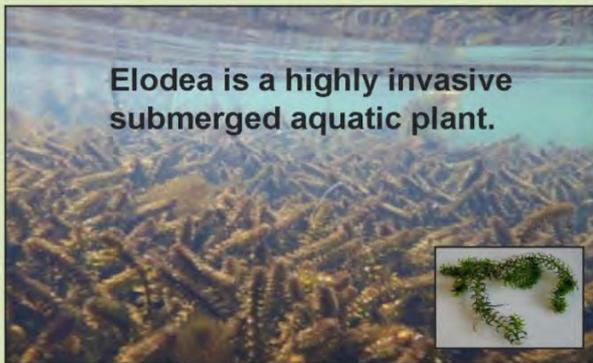


Please join us for a community meeting to discuss what to do about the discovery of Elodea in Stormy & Daniels Lakes.

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.



## 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



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



# 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

John M. Morton (USFWS Kenai National Wildlife Refuge, Soldotna)  
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

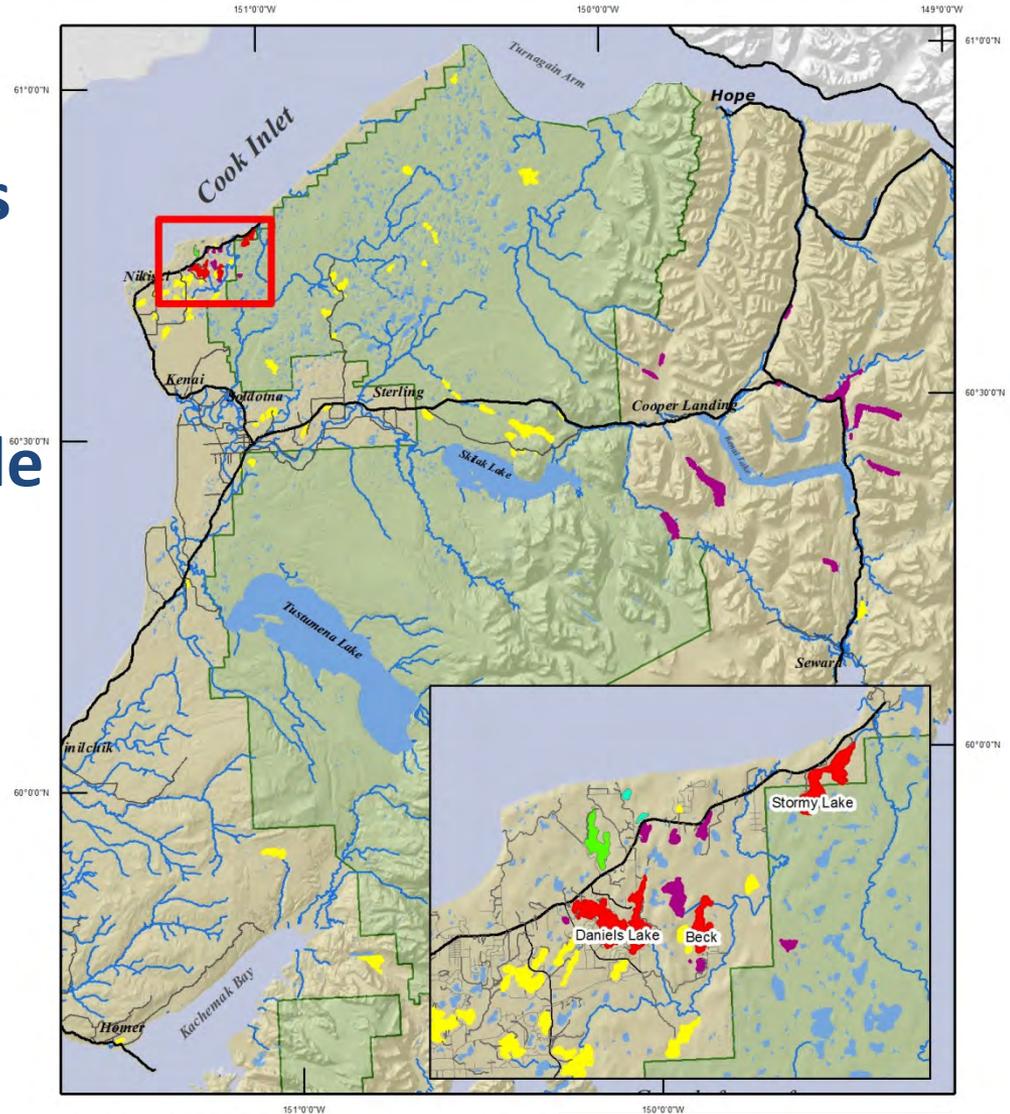


Kenai Watershed Forum

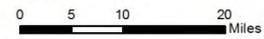




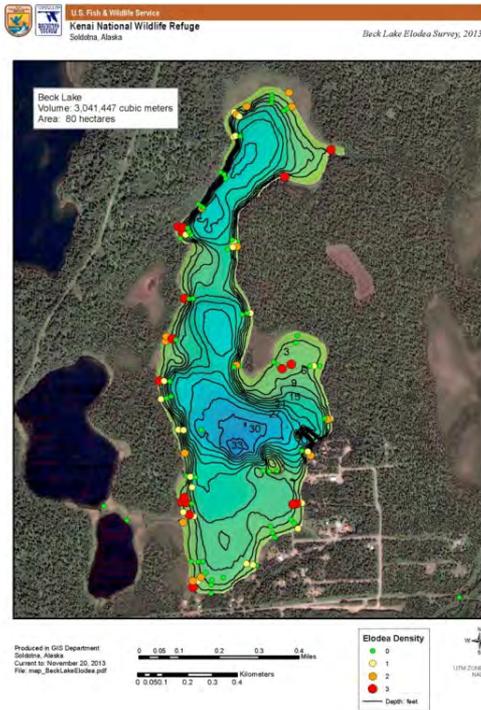
**Surveyed 100+ at-risk lakes before (and during) treatments to assess feasibility of peninsula-wide eradication...**



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

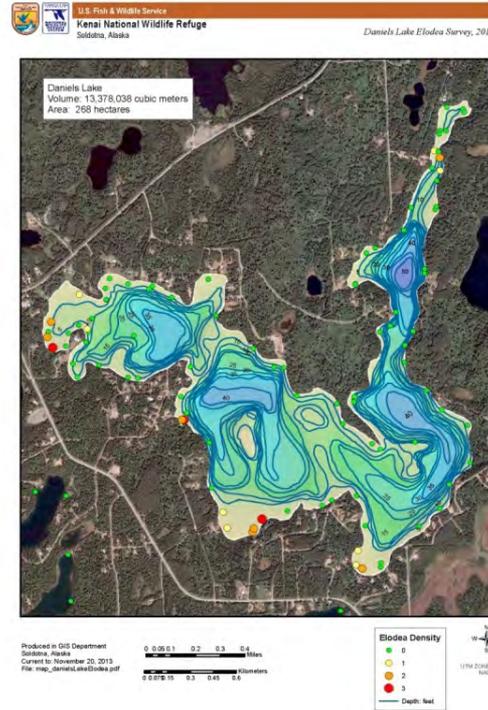


## Beck Lake (200 ac) whole treatment



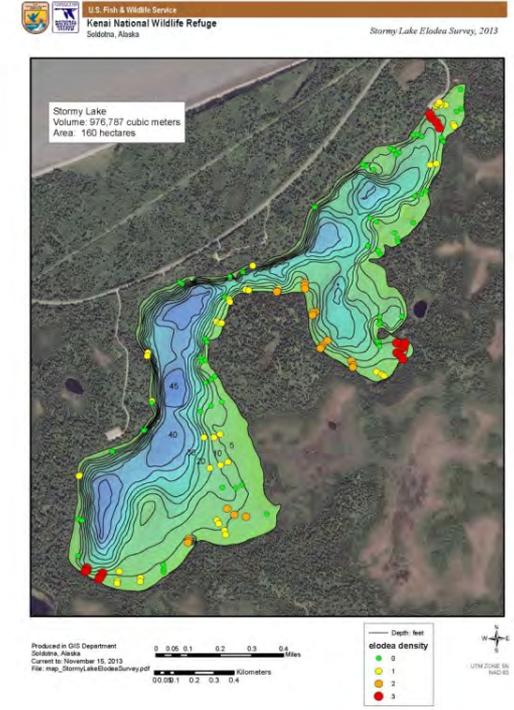
- Some private landowners
- Floatplanes
- NO public access
- Flows into Bishop Creek
- Rainbow trout

## Daniels Lake (640 ac) partial treatment



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

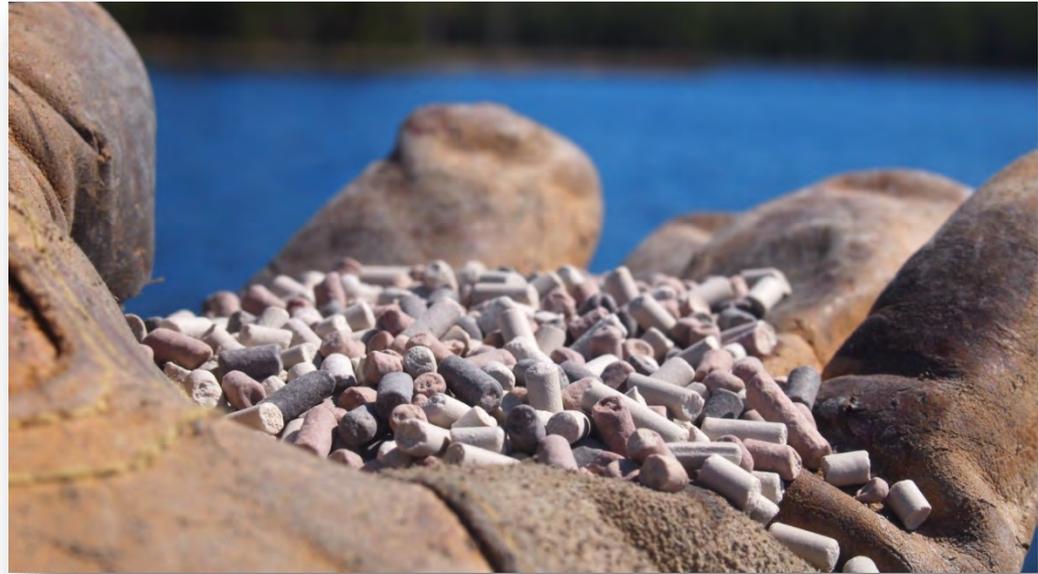
## Stormy Lake (400 ac) whole treatment



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

# Fluridone kills elodea systemically and selectively with few nontarget effects

- ✓ Absorbed via roots and shoots (systemic)
- ✓ Inhibits carotenoid synthesis (photosynthesis) and elodea is particularly sensitive (selective)
- ✓ Needs to be in water column (4–10 ppb) 45–90 days
- ✓ Applied as liquid or slow-release pellets
- ✓ Degrades by photolysis, adsorption, absorption
- ✓ No swimming, potable water or fishing restrictions (<150 ppb)



## PRESCRIBED: 4 herbicide treatments over 3 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> fluridone	\$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>

## ACTUAL: 2+ herbicide treatments over 2 years (2014-15) to eradicate elodea

	Beck	Stormy	Daniels	Cost
acres	200	400	660 (100)	
approach	WHOLE	WHOLE	PARTIAL	
June 2014	liquid/pellet fluridone	liquid/pellet fluridone	diquat fluridone	\$360k
Sept 2014	pellet	pellet	pellet	
June 2015	pellet	pellet*	pellet*	\$144k
June 2016	pellet	pellet	pellet	<del>\$116k</del>

# Application equipment



**Pellet blower for SonarONE**



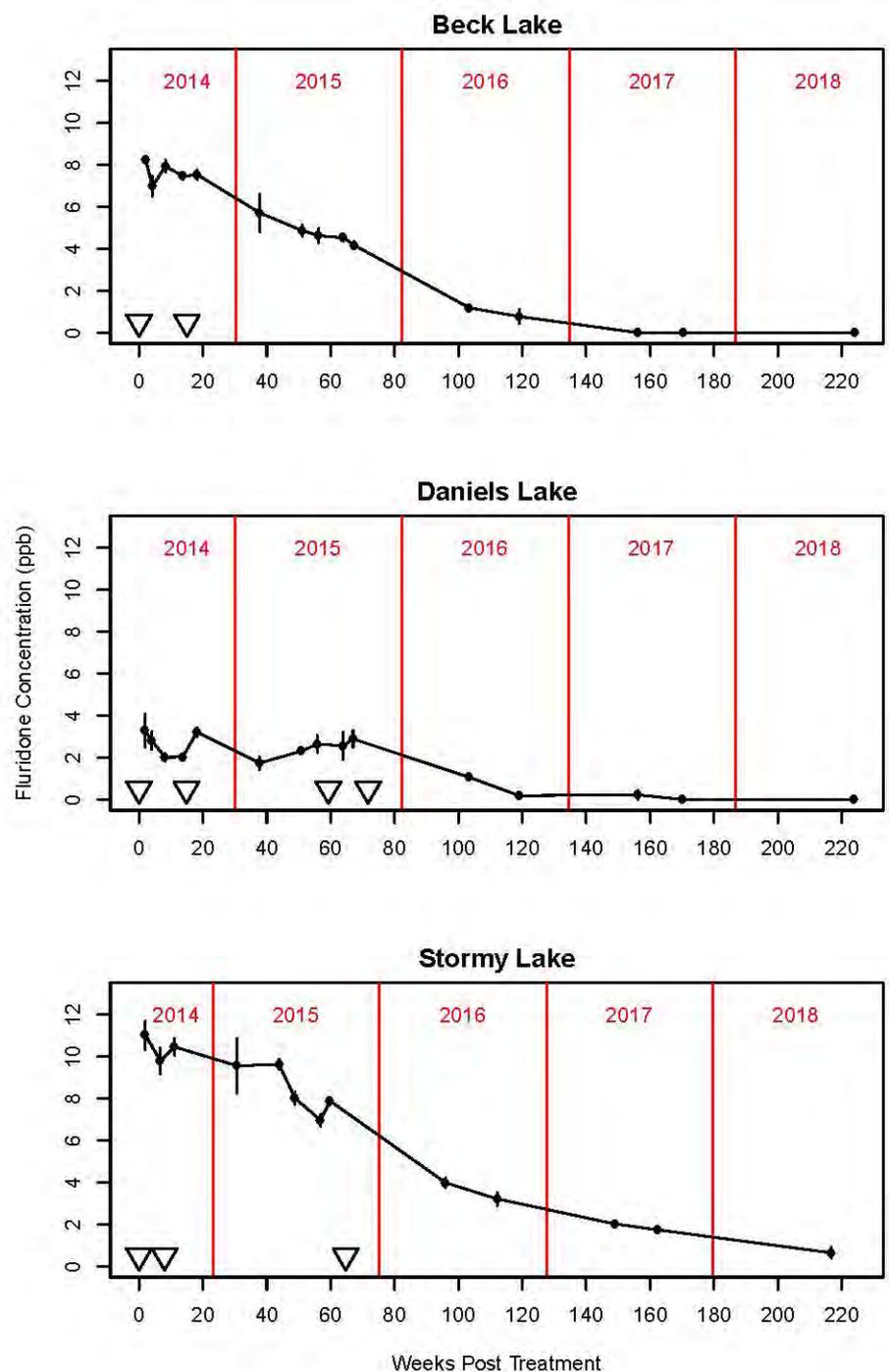
**Pump for Sonar Genesis, Diquat**



# Did it work?



- 1<sup>st</sup> application (Beck, Daniels) 3-4 Jun 2014
- 1<sup>st</sup> application (Stormy) 23 Jul 2014
- 2<sup>nd</sup> application (Beck, Daniels, Stormy) 16-17 Sep 2014
- 3<sup>rd</sup> application (Daniels) 24 Jul 2015
- 4<sup>th</sup> application (Daniels) 19 Oct 2015



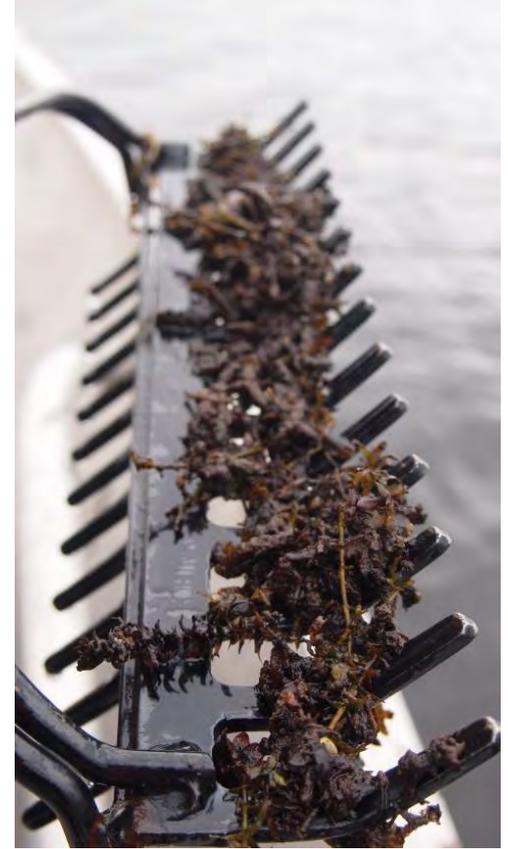
# Did it work?



2 weeks (Stormy)



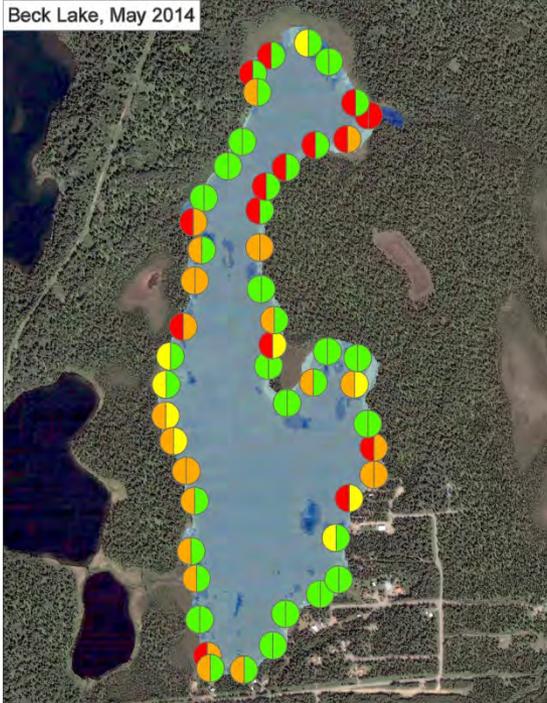
8 weeks (Beck)



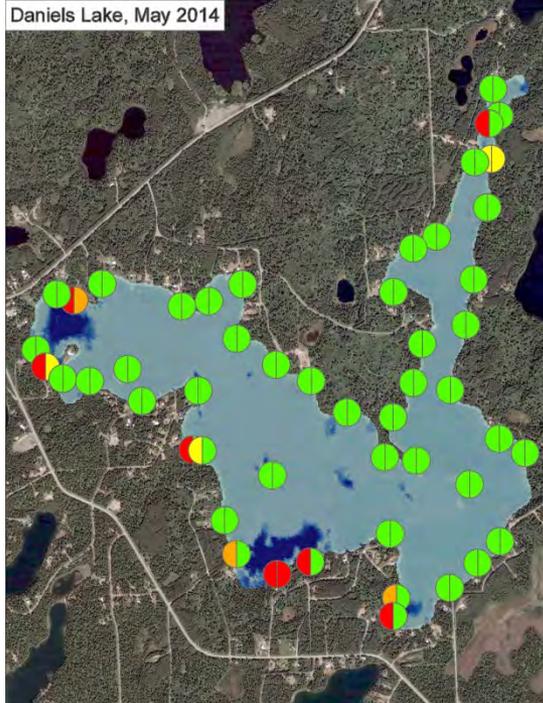
14 weeks (Beck)

# Did it work?

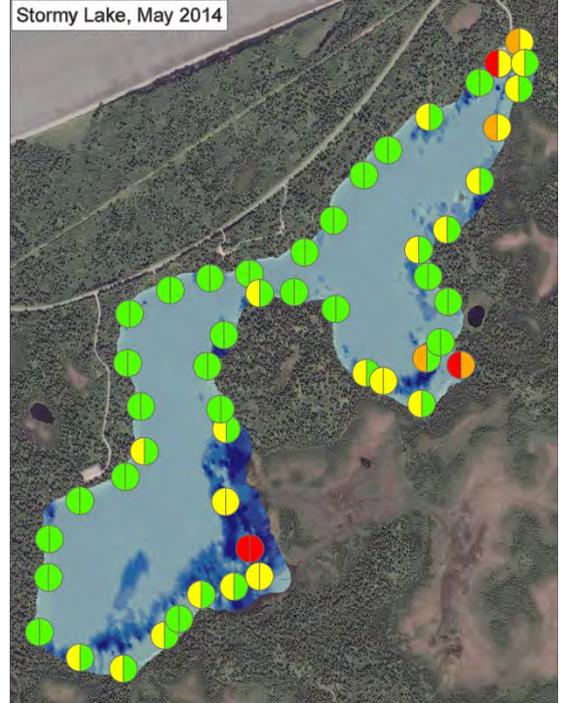
Beck Lake, May 2014



Daniels Lake, May 2014



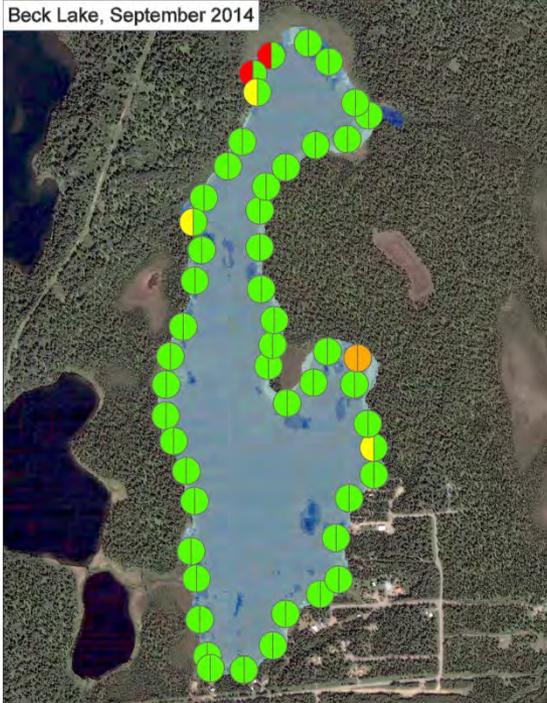
Stormy Lake, May 2014



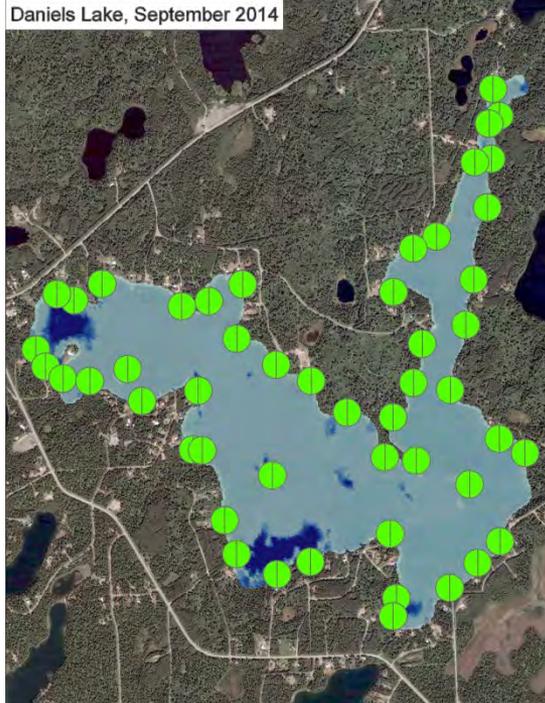
SURVEY	LAKE		
	Beck	Daniels	Stormy
May 2014 (pre-trmt )	<b>70</b>	<b>22</b>	<b>50</b>

# Did it work?

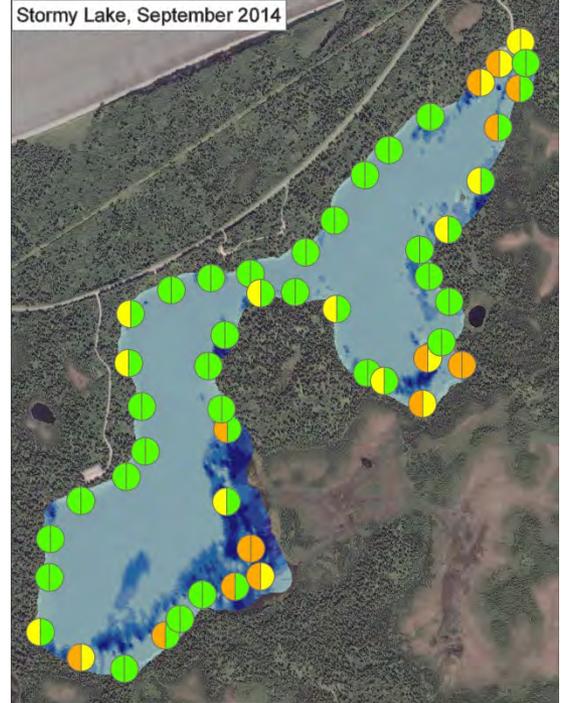
Beck Lake, September 2014



Daniels Lake, September 2014



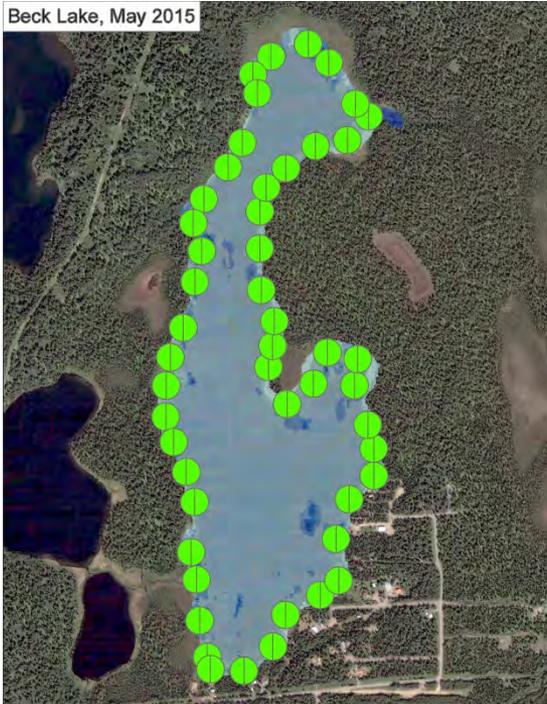
Stormy Lake, September 2014



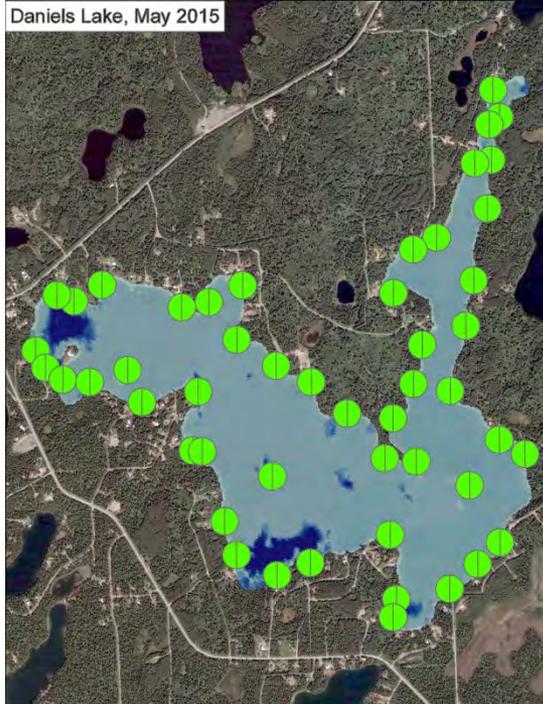
SURVEY	LAKE		
	Beck	Daniels	Stormy
May 2014 (pre-trmt )	70	22	50
Sept 2014 (post)	<b>12</b>	<b>0</b>	<b>46</b>

# Did it work?

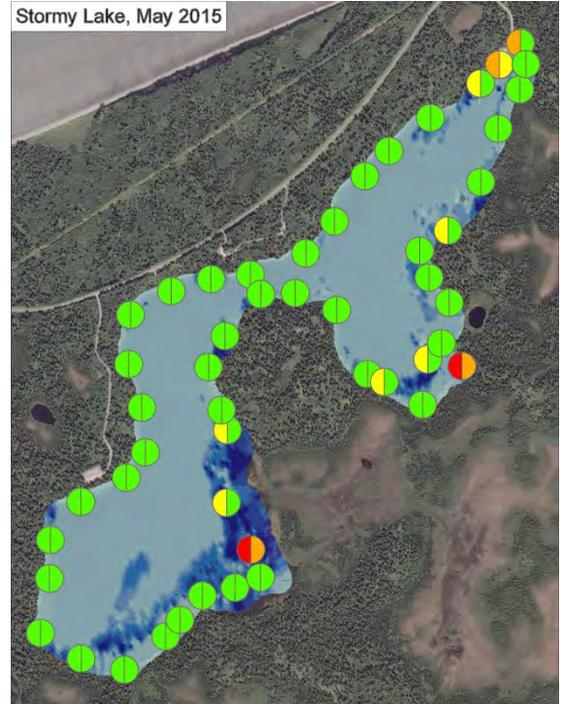
Beck Lake, May 2015



Daniels Lake, May 2015



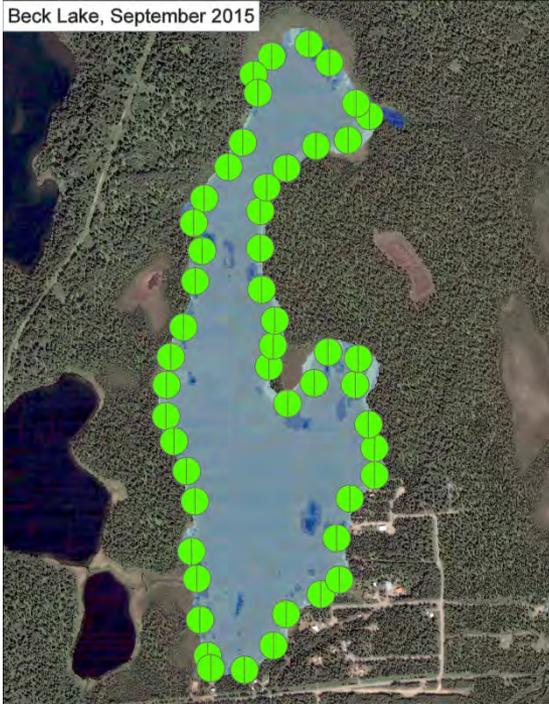
Stormy Lake, May 2015



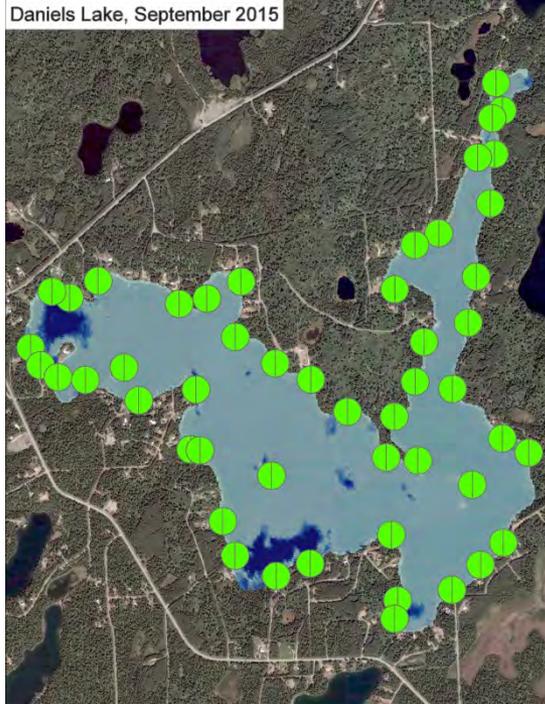
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# Did it work?

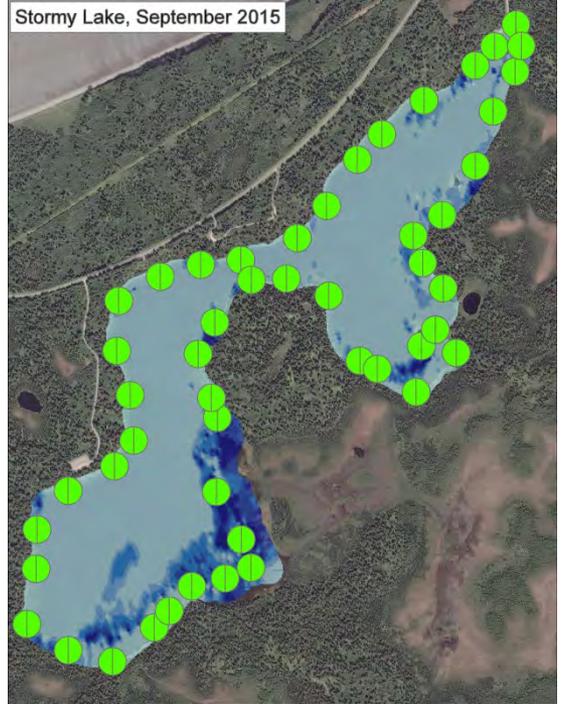
Beck Lake, September 2015



Daniels Lake, September 2015



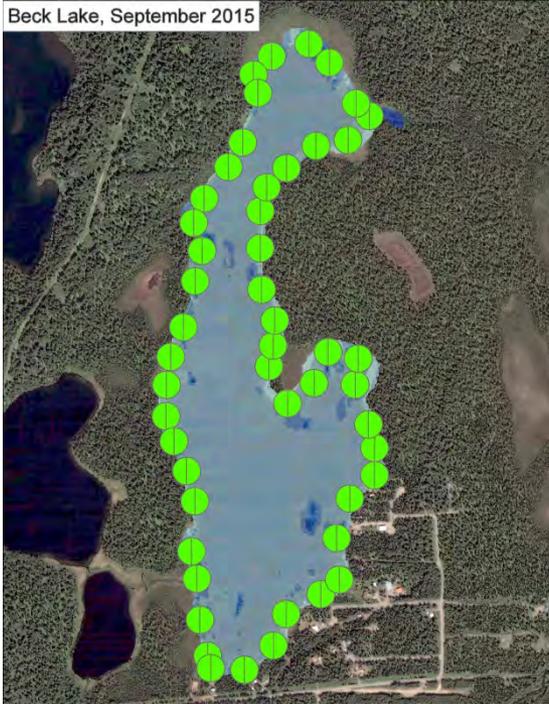
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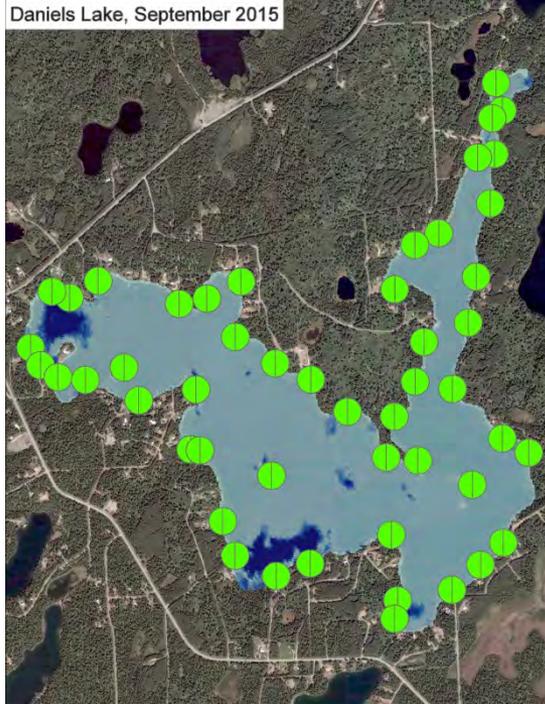
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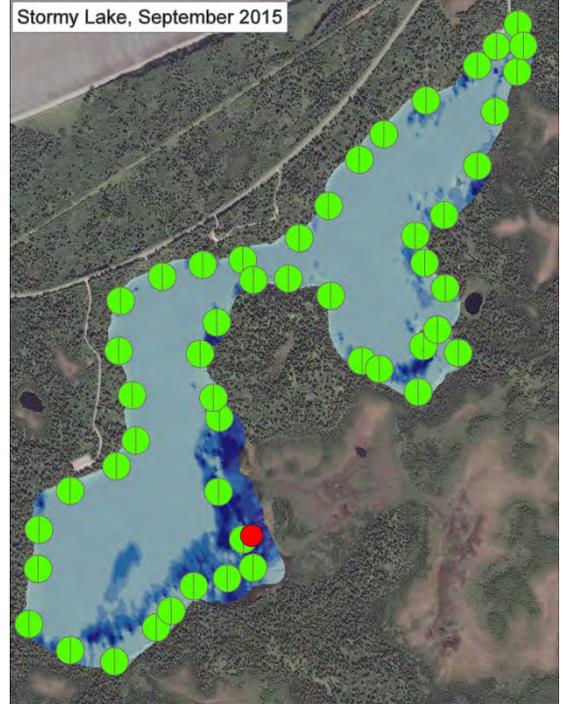
Beck Lake, September 2015



Daniels Lake, September 2015

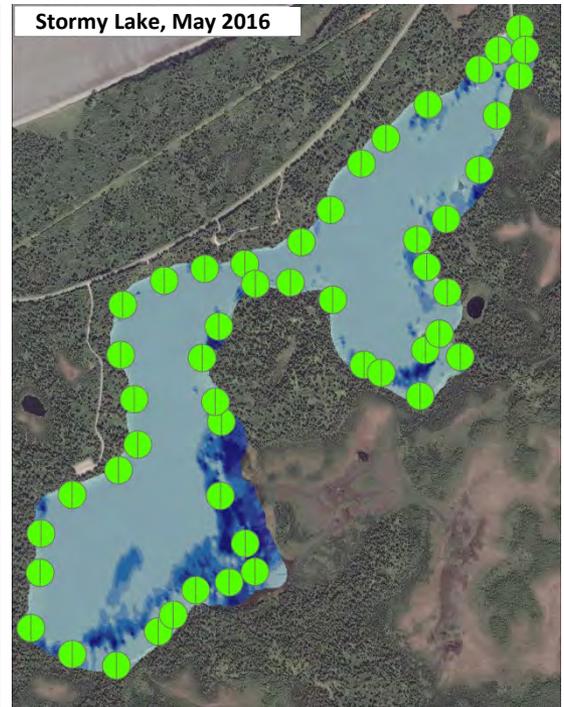
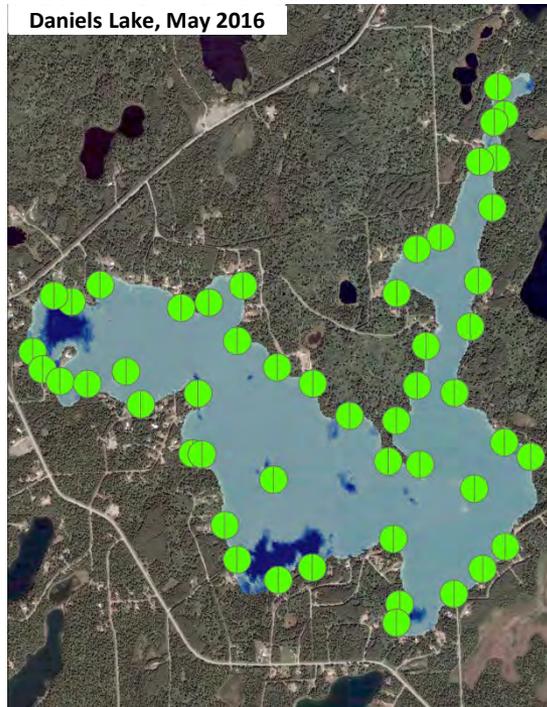


Stormy Lake, September 2015



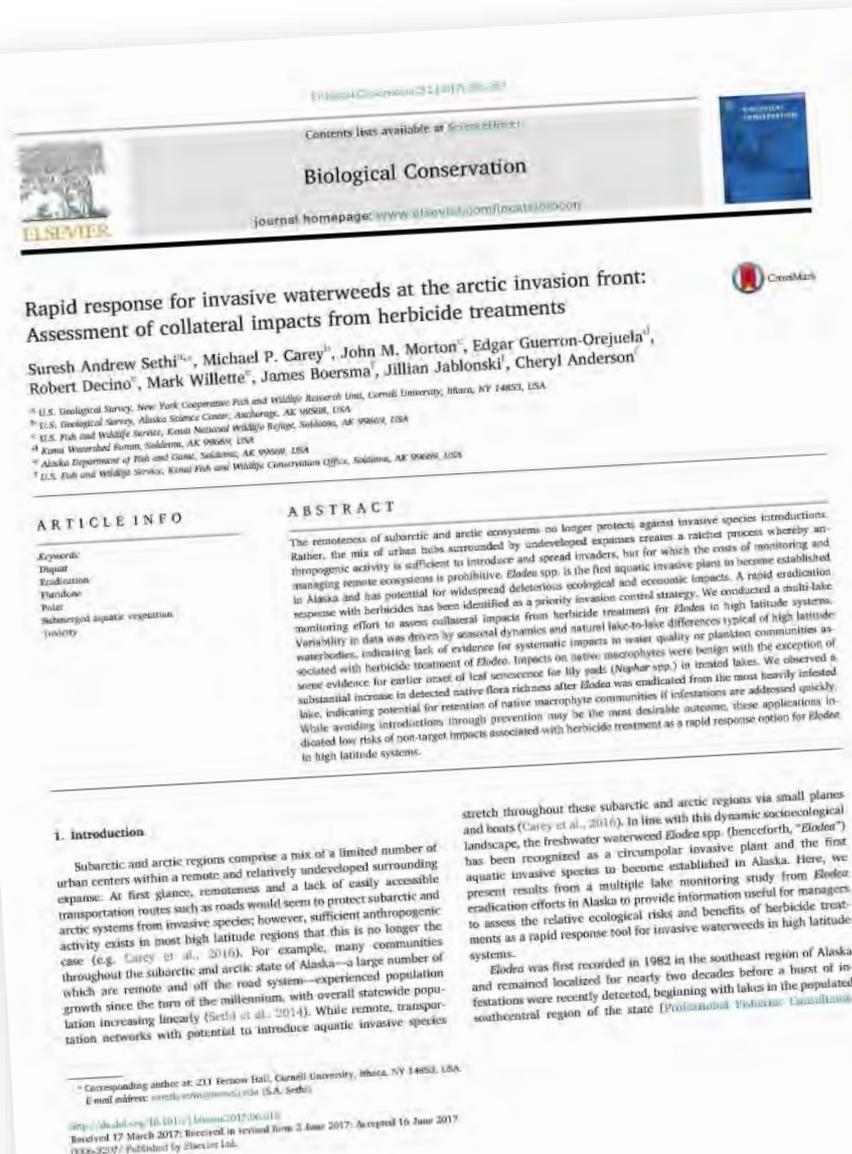
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# Did it work?



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May 2014 (pre-trmt )	70	22	50
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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>

# Secondary effects of fluridone



- No systemic effects on zooplankton
- No systemic effects on water quality
- Some necrosis, loss of non-target plants





Sports Lake  
Feb 2017  
*E. canadensis*

**With permit  
exemptions,  
2 new infestations  
detected in 2017  
eradicated by 2019**



N/S Lakes  
Jul 2017  
hybrid

# Why Kenai cares about other parts of Alaska.....



**PETCO,  
Soldotna**

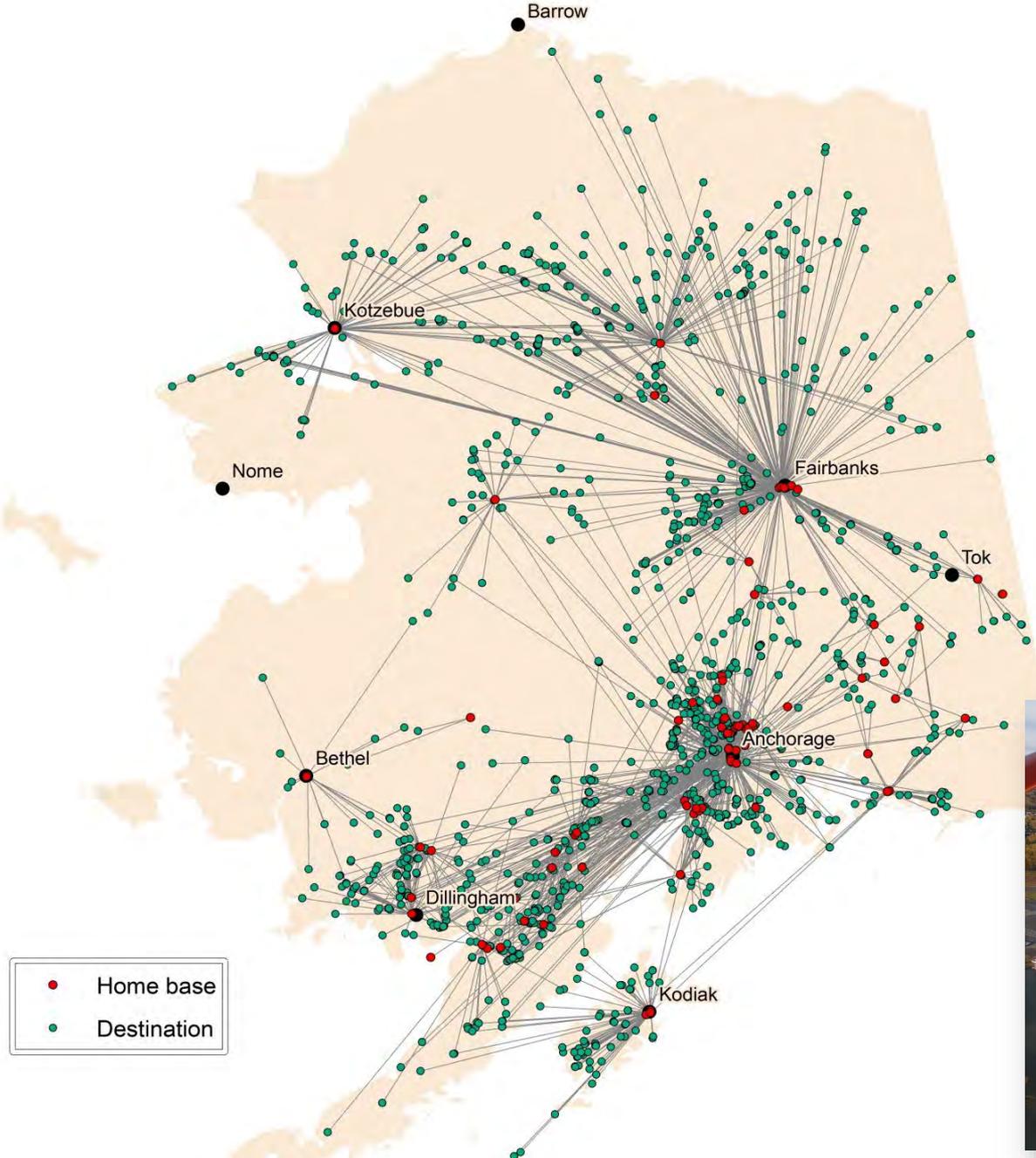


**Cordova**



**Sports  
Lake**

# Floatplane destinations



# Why EDRR is working on the Kenai

- **Clear management goal (eradication)**
- **Dedicated interagency project team (CWMA, landowners) working closely with AK-DNR**
- **Found the right experts (SePRO, Anderson, Les)**
- **Adaptive IPM plan (NEPA, permits, proposals)**
- **Take advantage of life history traits (dioecious, winter growth)**
- **Diquat used 2x (partial lake treatment, reduce risk of spread)**
- **Outreach to sustain support (public meetings, workshops, newspaper articles, radio interviews)**
- **Continuing surveys and resurveys**





# Daniels Lake post-treatment

**QUESTIONS??**