Distribution and ecology of Elodea on the Copper River Delta Cordova, 09/09/2015

2015 Sampling Objectives



Elodea Presence on Copper River Delta 2015





Vegetation Sampling Methods



- Simple Presence/Absence Surveys in ponds and sloughs across Delta
- Point-Intercept Method for infested ponds
 - I m² PVC plot frame placed at random stratified points generated by ArcGIS throughout area where % cover value assigned to each species identified.
 - Couble headed rake thrown from a boat at regularly spaced grid points generated by ArcGIS with retrieved vegetation evaluated on a "fullness" scale to yield relative abundance.
- Line-Intercept Method for large infested lakes
 - Transect tape 100m long extended perpendicular from shoreline with 1 meter² PVC plot frame placed every 10m and % cover value assigned to each species identified.

Elodea Presence 2015 - West Delta



Point Intercept Surveys at Ponds

Eyak Ponds (Old Cannery site)



Clear Martin Ponds

Wrong way and Wooded Ponds

0 0.0275 0.055 0.11 Miles

Random Start Transects:

- Martin Lake ullet
- McKinley •

10 10 1 10

Eyak •





Initial Aquatic Vegetation Observations



- Sampling for the
 2015 field season is
 still ongoing
- Data is preliminary and has not yet been analyzed



- Abundance (Biomass) of *Elodeaincreased* throughout the growingseason, especially in Martin Lake
- Distribution of infested patches vary greatly among sampled ponds and lakes.
- Diversity of native aquatic species
 exists even within *Elodea* patches of
 greater density, though relative
 abundance (cover) shifted throughout
 growing season.



Fish, Invertebrate and Water Chemistry Sampling





Initial Observations

Fish

- No signs of vegetation growtheither native or invasive- on spawning beds.
- Recognize the importance of aquatic vegetation as habitat for juvenile fish.

Invertebrates and water chemistry

- Over 600 samples collected from 9 different water bodies.
- Water samples collected for analysis at University of Notre Dame.



Vegetation Community Types of Bering Lake pre-*Elodea* introduction (1993)

		n at <i>x</i> -m Distance from Shore			
Community Type	n	5-m	30-m	>30-m	Mean Depth (Min., Max.)(ft.)
Potamogeton perfoliatus richardsonii					
(canopy cover < 50%)	41	4	4	33	2.38 (0.01, 3.84)
(canopy cover $> 50\%$)	7	2	3	2	1.21 (0.29, 2.45)
Potamogeton filiformis - Potamogeton perfoliatus richardsonii	4	2	2		0.56 (0.21, 0.8)
Potamogeton filiformis	9	4	4	1	0.48 (0.04, 1.38)
Callitriche hermphroditica	4	2	1	1	0.51 (0.22, 1.09)
Ranunculus tricophyllus	6	1		5	1.75 (1.26, 2.52)
Subularia aquatica	2		2		0.99 (0.84, 1.14)
Sparganium angustifolium	1		1		0.7 (0.7, 0.7)
Hippuris vulgaris	2	1	1		0.52 (0.48, 0.56)
Unvegetated	16	9	5	2	0.36 (0.01, 1.16)

Table 1. Vegetation community types with number of plots by type and by type verses distance from shore, and average, minimum and maximum depth. Data collected on 7-9 August 1993.





0 0.4 0.8 1.6 Miles



What's next...

- Final round of vegetation and invertebrate sampling for 2015 to begin next week
- Visit Bering Lake plots if visibility clears

2016

- Repeat vegetation transects and point intercepts at one month intervals starting in May, 2016
- Determine contribution of *Elodea* biomass to system and its effects on dissolved Oxygen (O2 sensors out for 12 months)
- Continue to monitor presence/absence in Dusky nest island ponds
- Determine limiting factors for Elodea on the delta (turbidity, depth, salinity, substrate, chemistry) and use to assess waterbody vulnerability
- Potential development of eDNA markers for easier detection (DOD-JBER project lead)

Proposed Small Scale Fluridone Treatment

Wrong Way and Wooded Ponds



Project Collaborators

USFS Fisheries and Ecology

- Andrew Morin
- Gordie Reeves (PNW Research Station)
- Elizabeth Camarata
- Kate Mohatt
- Alanna Gotshall
- Rachael Ertz

Outside Researchers

- Marty Berg Loyola University Chicago
- Gary Lamberti- Notre Dame
- Phil Carbary Oregon State University and Loyola
- Carmella Vizza- Notre Dame

