ELODEA IN SOUTHCENTRAL ALASKA

Early Detection and Rapid Response in Action

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Elodea in Alaska

• First recorded in 1982 in Eyak Lake in Cordova
• Recorded in Fairbanks area in 2009
• Found in 3 Anchorage area lakes soon after
• Found on the Kenai Peninsula in 2012, more found in 2013
• More populations found around Cordova in 2012-2014
• One population found in the Matanuska-Susitna Valley north of Anchorage in 2014
Statewide Distribution

Map showing the distribution across various regions including Anchorage, Fairbanks, Mat-Su Valley, Cordova, and Kenai Peninsula.
Elodea on the Kenai

• First found in September 2012 in Stormy Lake (being treated for northern pike with rotenone)

• Fragment found in Daniels Lake soon after

• Stormy Lake infestation surveyed in winter 2013

• Complete survey in Daniels Lake, winter & spring 2013

• Beck Lake infestation found in summer 2013

• Source could be a pet/aquarium shop in Nikiski that closed in 1990s? A float plane? Uncertain.
Sounding the Alarm

It’s possible that this photo was staged, but the message is clear.
Winter Surveys

• Test protocol visit to Stormy Lake in January
  • Snowmachine access, gas-powered auger, chimney brush, underwater camera

• Complete survey of Daniels Lake in February

• Genetic testing of both lake’s populations by Dr. Donald Les at University of Connecticut
  • Determined to be a hybrid between *E. canadensis* and *nuttallii*
Stormy Lake test survey, January 2013
Daniels Lake full survey, February 2013
Stakeholder Inclusion Process

• Include all agencies, organizations, local government, and citizens in planning process

• All property owners on Daniels Lake contacted, January 2013
  • Public meeting February 19, 2013, to discuss issues
  • Aquatic invasion expert, Dr. Lars Anderson, joined us from UC-Davis/ARS

• Sustained outreach – phone updates, citizen group lead, meetings, development & distribution of public service announcements, brochures, flyers
Community Elodea Information Meeting
Nikiski Community Recreation Center
Mile 23.4 Kenai Spur Highway
Tuesday February 19th, 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

Elodea is a highly invasive submerged aquatic plant.

Why we don’t want Elodea

Nuisance: impedes boat and float plane launching, navigation, and fishing
Safety: fouls float plane rudders and boat propellers
Economic: reduces property values by fouling launch sites and shore habitats
Ecological: degrades salmon spawning habitat

Elodea will cause serious, irreversible harm to aquatic habitats, resulting in degraded fisheries if allowed to spread unchecked.

Distinguishing Features of Elodea:

Leaf: Leaves are arranged in whorls of 3 (occasionally 4) and are densely packed along the stem. Leaves are about 1cm long and are finely toothed along the edges.

Stem: Long, slender, generally branched and typically lighter in color than leaves.

Elodea remains submerged and forms tangled masses in lakes, ponds, and slow moving streams. Individual plants can vary in appearance, with some robust and others with long inter-nodes.

Please help prevent the spread of aquatic invaders:

CLEAN DRAIN DRY

Report aquatic invasive sightings to 1-877-INVASIV

Stop Aquatic Invasive Species!

Elodea

This aquatic plant is NOT NATIVE to Alaska. Elodea survives freezing and can spread by tiny fragments.

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Native Alaskan aquatic plants that can be confused with Elodea

Potamogeton richardsonii - Richardson’s Pondweed
Description: Densely packed, alternately lance-shaped leaves. Leaves have wavy, crinkled margins and are inter-connected with 7 or more stems.

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Callichithra californica - Northern Water Starwort
Description: small deliquescent plants usually found in shallow water. Leaves root to the bottom with 2 appressed, hair-like, leaf tips joined to each other. Leaves usually have 2 leaves forming a bifoliate.

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Myriophyllum sibiricum - Siberian Milfoil
Description: Native-like elodea-green submerged leaves are arranged in whorls of 3-4, with fewer than 2 trailing parts. Underwater leaves up to 20mm wide and 5-20mm long. Leaf tips have two leaflets forming a bifoliate.

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Flyer courtesy Darcy Etcheverry
ELODEA
spread the word, not the weed!

Eloedia is a very invasive submerged aquatic plant. It survives freezing & spreads by tiny fragments introduced by float planes, boats, trailers, school/home aquariums, and equipment. It is not native to Alaska.

We DON'T want Eloedia in Alaska
- Safety: floats float made vessel &loat paddle
- Nuisance: impinges boat, rot, float plane launching, navigation, & fishing
- Ecological: degrades salmon spawning habitat
- Economic: reduces property values by fouling launch sites/habitats

Confirmed infestations
- Anchorage: Sand, Delong, Little Campbell Lake
- Fairbanks: Chena Lake, River & Slough
- Cordova: Eyak, McAlpine, Martin Lake
- Kenai Peninsula: Stormy & Daniel Lakes

Float Plane Operators - Alaska
- Inspect & clean your aircraft before
- Before landing don't touch thick propeller & float plane
- After takeoff rotate to lower propeller to help
- Avoid thick ice and be careful when landing
- Watch for Ice Floe Inspection & Decontamination

Report sightings & help identify new
- Note location GPS or map on map & write
- Take a specimen if possible photos at a mm (including the flower if present). Put it in a ziplock bag with ice
- Call 1-877-INVASIV to report sightings!

Support eradication efforts!
- Join the Anchorage Rowing Association and long-time rower Marjorie "E" Hall, Explorers.

Recent sunny weather may mean a bumper crop for Alaska’s Eloedia infestations!

Elodea, believed to be Alaska’s first fully submerged aquatic invasive plant, you may have seen Elodea choking out areas of fish beds, Little Campbell Lake, Delong Lake in Anchorage and Chena Slough in Fairbanks. It’s also been found in a growing number of lakes and streams moving riverbeds in Cordova and on the Kenai Peninsula.

Should we be concerned? Yes! Elodea survives under ice. When introduced to a new waterway, Elodea grows rapidly, overtopping native plants, filling the water column, and changing the habitat conditions to which native fish and wildlife are adapted. Thick mats form at or just below the water surface and can float boat propellers and float plane rotors, causing a hazard. In addition to impeding fishing, navigation, boat launching, and paddling, it can also reduce waterfowl property values.

From founder of the Anchorage Rowing Association and long-time rower Marjorie "E" Hall, Explorers.

"As a member of Steel Lake since 1946, I was recently astounded by the Elodea build-up. With water, water everywhere, the lake Elodea seems to eat much food and water in quantity. It is obvious how damaging this weed will become to fish if it is not controlled."

The growing negative impact of Elodea can most recently be seen in the closure of Stormy Lake (located within the Captain Cook State Recreation Area near Nikiski) to watercraft and aircraft for the 2017 summer season in an effort to prevent its spread.

How does it spread? Fragments of Elodea dropped by watercraft, trailers, float planes or other outboard equipment are easily spread to new waters. New infestations can also result from intentional (unbeknownst) release from school/home aquariums. In Alaska, live specimens of Elodea are used to teach students about cell structure—it's also a popular aquarium plant.

Although Elodea has only been confirmed in 15 waterbodies in Alaska to date, its foothold in float plane lakes like Steel Lake can easily spread to other waters. Although Elodea has only been confirmed in 15 waterbodies in Alaska to date, its foothold in float plane lakes like Steel Lake can easily spread to other waters.
ADF&G in action at the public meeting

Agency debriefing (with independent expert Dr. Lars Anderson)
Daniels Lake Spring Revisit, May 2013
Decision Tree for Treatment in 2013

Elodea widespread on KP

YES
No action

NO

Stormy/Daniels Lakes

Additional funds available

$340K
Fluridone Stormy
Fluridone Daniels

$80K
Fluridone Stormy
Diquat Daniels

Additional funds NOT available

$40K
Close Stormy
Fluridone Daniels

Diquat Stormy
Diquat Daniels
FOR IMMEDIATE RELEASE
May 22, 2013

CONTACT:
Division of Parks & Outdoor Recreation, Kenai/Prince William Sound Area
Jack Blackwell, Superintendent, 907-262-5581, jack.blackwell@alaska.gov

Stormy Lake closed to watercraft and aircraft this summer due to Elodea

(Soldotna, AK) – Stormy Lake is closed to watercraft and aircraft for the summer season while government officials assess and seek to control spreading of the invasive aquatic plant, Elodea.

The director’s order closing Stormy Lake – located within the Captain Cook State Recreation Area near Nikiski – was signed on Monday. The closure was recommended by a state and federal agency working group seeking to address Elodea infestation on the Kenai Peninsula.
Regulatory Process

- NEPA – Environmental Assessment
  - EA Draft available for public comment: June 23 - July 12, 2013
  - EA submitted to USFWS August 1, 2013
  - EA finalized September 2013

- NPDES-PGP (National Pollutant Discharge Elimination System – Pesticide General Permit) - DEC
  - NOI (Notice of Intent) filed with DEC: March 20, 2013
  - General Permit Authorization: March 26, 2013
  - NOI updated to include Bishop Creek: May 30, 2013
  - General Permit Update Authorized: June 14, 2013

- Diquat (Reward) PUP (Pesticide Use Proposal) - DEC
  - Application Submitted to DEC: April 3, 2013
  - DEC approve application to proceed with public comment: April 9, 2013
  - Public comment period: April 12 - May 13, 2013
  - Permit Issued: June 3, 2013
  - Permit effective: July 13, 2013
Regulatory Processes

- **Fluridone (Sonar) PUP - DEC**
  - Permit application initially submitted April 30, 2013
  - PUP application revised by project team and at the request of DEC and resubmitted May 30, 2013
  - DEC requested additional information July 3, 2013
  - Permitting window for Sonar closed so the application will be resubmitted in late fall to DEC

- **Other Permits**
  - ADF&G: Fish Habitat Permit
  - DNR ML&W: Lands Use Permit
  - Both were initially submitted in August 2013 but were put on hold for revisions over winter 2013-2014

- IPM Completed March 2014
Pesticide Selection

• Both approved for use in Alaska

• Diquat (Reward, Aquacide, etc.)
  • Contact herbicide
  • Lower or localized application, but less effective
  • Cheaper

• Fluridone (Sonar) – SePRO
  • Sent elodea samples for company to grow
  • Titration/calibration tests to determine correct amount for lake based on volume and temperature
  • Slow-acting, systemic herbicide
  • May require whole-lake or larger-area application
2013 Surveys

• Group Effort (field office, refuge, ADF&G)
  • 2 lakes, 256 points, 1010 acres

• Field office survey
  • 17 lakes, 279 points, 2005 acres
  • Aquatic plant data per lake

• Refuge staff survey
  • 6 lakes, 71 points, 1534 acres
  • Aquatic plant data per point

• Friends of Alaska Refuge volunteer survey, administered by Refuge office
  • 39 lakes, 196 points, 4730 acres
  • Some aquatic plant data per point/lake, Sonde water quality data

• Incidental observations and calls, other surveys
  • Private citizens, Kenai Airport float plane basin, Homer area
Mapping

- 2013 - 68 lakes surveyed
- 2014 – Additional 10 lakes surveyed
Field Office surveys

Photos courtesy Cheryl Anderson
Beck Lake elodea jackpot
(Cheryl Anderson)
Friends of Alaska Wildlife Refuges Volunteer Survey

Survey by rowboat or canoe

Four groups of two, one week each; one group of two, three weeks = 10 volunteers, 7 weeks
Remote lake surveys – Refuge staff
Timberlost Lake - trailing vegetation from the supercub…
Treatment Calibration

- SePRO, manufacturer of Sonar
  - Sent live samples to lab in CO for growth in tanks
  - Grew best in cold water
  - Titration tests to determine maximum result with minimum application level
- Bathymetry information to calculate volume of application by depth and vegetation density
- Survey location information to determine specific locations in partial-lake treatments
### Application Cost and Schedule

**Table 4.** Prescribed partial-lake treatments of Daniels Lake with pelleted (SonarONE®) formulation of fluridone in 2014-16. In addition, a one-time treatment of diquat bromide (Reward®) will be applied in June 2014 to prevent elodea from continuing to spread in Daniels Lake.

| PARTIAL LAKE TREATMENTS | SonarONE® PRESCRIPTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|--------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Treatment Area          | Acres | Depth (ft) | Mean volume (ac-ft) | % lake volume | June 2014 | Sept 2014 | June 2015 | June 2016 | Total Product (lbs) | Cost | Theoretical lake-wide concentration (ppb) | Theoretical in-water concentration (ppb) |
| 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 | | | | | | | | | |
**Pre-Treatment Surveys**

- Booms put on lake outlets
  - Bathymetry mapping
    - Lowrence HDS Charter/Sonar with StructureScan (downscanning and side scanning)
    - calculate volume of application by depth and vegetation density
- Systematic vegetation survey
  - 50 segments per lake
  - Rake throws lakeward and shoreward
Stormy Lake
Perimeter: 9586.44 m (5.96 miles)
Segments: 191.73 m (629.03 ft)
Area: 388 acres (157 hectares)
Beck Lake

Perimeter: 5634.89 m (3.50 miles)
Segments: 112.70 m (369.74 ft)
Area: 193 acres (78 hectares)
Daniels Lake
Perimeter: 15821.20 m (9.83 miles)
Segments: 316.42 m (1038.13 ft)
Area: 621 acres (251 hectares)
Treatment Time

• Staged at Kenai Refuge HQ
• Launch sites selected at Daniels and Beck Lakes with private owner’s permission
• Three boats – one fluridone pellet machine, one liquid diquat tank, and one concierge boat to deliver and rinse
• Posted signs, contacted landowners, public notices, contacted landfill
• Certified aquatic pesticide applicators on staff
• PPE and training
Application

- Diquat by liquid, fluridone by pellet, delivered by boat in transects

- SePRO scientists came up to assist and set up equipment
Monitoring

- FasTEST water analysis
- Vegetation segment resurveys
- Macro-invertebrate & plankton surveys
- Water temp & Sonde data
Economic Analysis

• Property value analysis
• Economic analysis by ISER staff/PhD student Toby Schworer – A decision analysis for management of elodea in Alaska – Is it worth taking a gamble or better to play it safe?
  • Formal decision analysis and risk assessment
  • Door by door paper surveys
Defining Goals

• Known extent of infestation on Kenai Peninsula lead to ERADICATION GOAL

• Required chemical treatment

• Contributed to ULTIMATE GOAL of statewide plan
  • Re-infestation is likely unless Anchorage populations are controlled near heavy-use floatplane lakes
  • Sharing documented information is critical
    • ADF&G mapping effort, AKEPIC database
    • Funded strike force team

Vegetation from Lake Hood in Anchorage, on Refuge Supercub rudder flying back to Soldotna
Challenges

- Leveraging funding effectively
- Cross boundary jurisdiction
- Interest level and ability by jurisdiction
- Distribution of statewide infestation
- High reinfestation probability if not systematically treated
- Climate effects known, but not published
- Vectors known, but not published
- Stakeholder buyoff on treatment options
What’s Next

• Continue treatment schedule

• Monitor to evaluate treatment success and effects (elodea presence, native plant presence, plankton, macroinvertebrates, etc.)

• Assist statewide survey and mapping efforts

• Guide other locations in effective treatment, funding, and stakeholder meeting strategies

• Support and develop extended studies – economic analysis, quantified vector/transmission analysis
Kenai Elodea Team

- USFWS
- ADNR
- ADF&G
- CIAA
- KPCWMA
- SePRO
- Homer SWCD
- CES
- NPS
- USFS
- ISER - UAA
- Friends of Alaska NWR
- Local Citizens

All photos/materials by me/refuge unless otherwise noted