1/23/12 OVERVIEW: INVASIVE SPECIES IN ALASKA AND AGENCY ACTION PLANS

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Department of Fish and Game Invasive Species Status Report 2012

House Resources Committee
January 23, 2012

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Invasive Species Program

Overview

Invasive Species are…
Pathways: How do they get to Alaska
Prevention: Measures taken
Species of Concern: Risk of introduction
Species of Special Concern: Present
Response Actions
In the Works: Planning and Response

Invasive Species

An organism introduced outside its native range that can damage environments, cause economic hardship to key industries, or pose risk to human health.

Not all nonnative species can sustain populations in their new environment. They require

- an agreeable climate;
- few to no natural predators, parasites or diseases;
- an abundance of food plants or prey that lack protection against the newcomer; and
- an ability to out-compete native species.

Pathways for Introduction

Invasive Species arrive in Alaska many ways

- Human-mediated: Commercial shipping, recreational vessels and gear, floatplanes, floating infrastructure, release of unwanted animals and plants, illegal stocking, aquaculture escapees

- Natural pathways: Ocean and river currents, cross-basin connections such as high water events, larval distribution

Impact on Native Species

Invasive species:

- Out-compete native species for habitat, food, space
- Degrade or destroy habitats
- Upset ecosystem functions, such as water and fire regimes
- Limit recreational and subsistence activities such as fishing, hunting, wildlife viewing, boating, etc.

Prevention

Regulations:

- Prohibit intentional transfer and/or introduction of live fish, wildlife and aquatic plants between locations without a permit.
  - Illegal introduction may result in misdemeanor and fine
- Prohibit use of live bait in freshwater.
- Prohibit use of felt soled wading boots when angling in freshwater.
- Regulate aquatic farming, farm products and certification of seed/spat imported for use in aquatic farm production.

Prevention

Regulations, cont.

- Maintenance of a Clean List of nonnative species that that can be possessed as pets (but not released into the wild) because they have proven to not be a threat to native species.
- Prohibit harboring Muridae rodents (rats) on vessels, vehicles, aircraft.
- Require a control plan to be implemented when Muridae rodents are found in facilities.

Prevention

Collaboration

- ADF&G works closely with federal, state, local and tribal governmental agencies; nongovernmental organizations, stakeholder groups, and the public to inform, engage, and respond to invasive species.

Inspections

- Work with federal partners to ensure Custom and Border Protection agents are trained to complete inspections of boats entering the State.

Prevention

Outreach

- Public Service Announcements: Radio and television
- Educational pamphlets, posters, books and cards
- Presence at sportsmen's shows, festivals, workshops, trainings and forums
- Provide materials to stakeholder groups and issue-centered bodies

Prioritize actions based on risk, species, and pathways.

Aquatic Species of Concern: Risk of Introduction

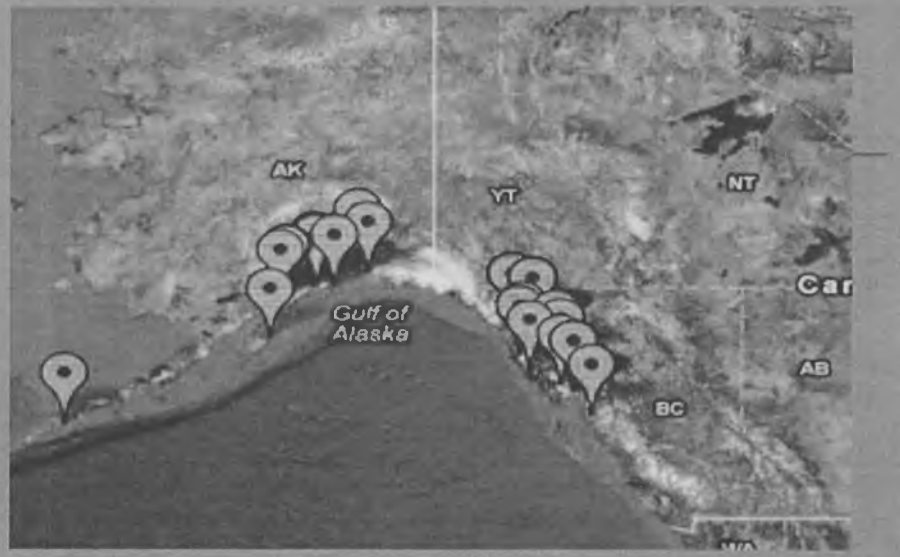
Atlantic salmon
European Green Crab
Marine Invertebrates: Tunicates
Chinese Mitten Crab
Zebra/Quagga Mussels
New Zealand Mudsnails
Rusty and Red Swamp Crayfish
Cordgrass; *Spartina* spp.
Hydrilla
Egeria Densa
Chytrid Fungus on Amphibians

Monitoring for Invasive Species

- Platewatch- Pacific coast tunicate monitoring
  - Locations: Ketchikan, Sitka, Kachemak Bay, Seward, etc.
- European green crab monitoring
  - Locations: Ketchikan, Klackas Bay, Sitka, Gustavus, Kodiak, Homer, Seward, etc.
- Educational Programming for the public and school children

Monitoring

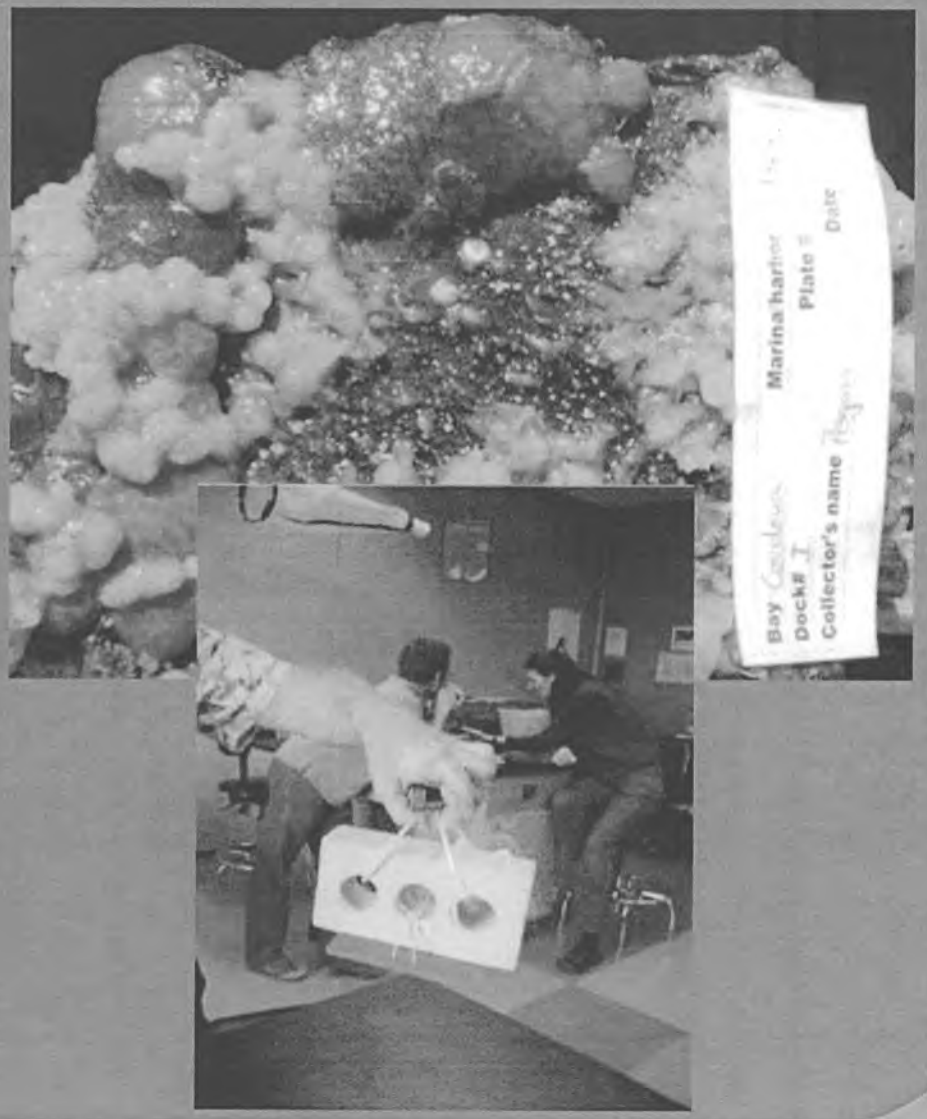
PLATEWATCH LOCATIONS



Chenega Bay
Cordova
Dutch Harbor
Gustavus (2)
Halibut Cove
Homer
Juneau (5)
Ketchikan (3)
Kodiak Island
Little Port Walter
Petersburg
Seldovia
Seward (3)
Sitka
Tatitlek
Thorne Bay
Valdez

* Positive for Botryllid Tunicates

COLLECTION PLATES



Monitoring

GREEN CRAB SAMPLING LOCATIONS

In 2011, European green crab were detected in Queen Charlotte Sound, BC. This accounts for a jump of 100 miles up the west coast of British Columbia and significantly nearer to Alaska.

Cordova
Homer
Ketchikan
Kodiak
Seward
Sitka
Valdez

Aquatic Species of Concern: Present in Alaska

Northern Pike- an invasive species when outside its native range.

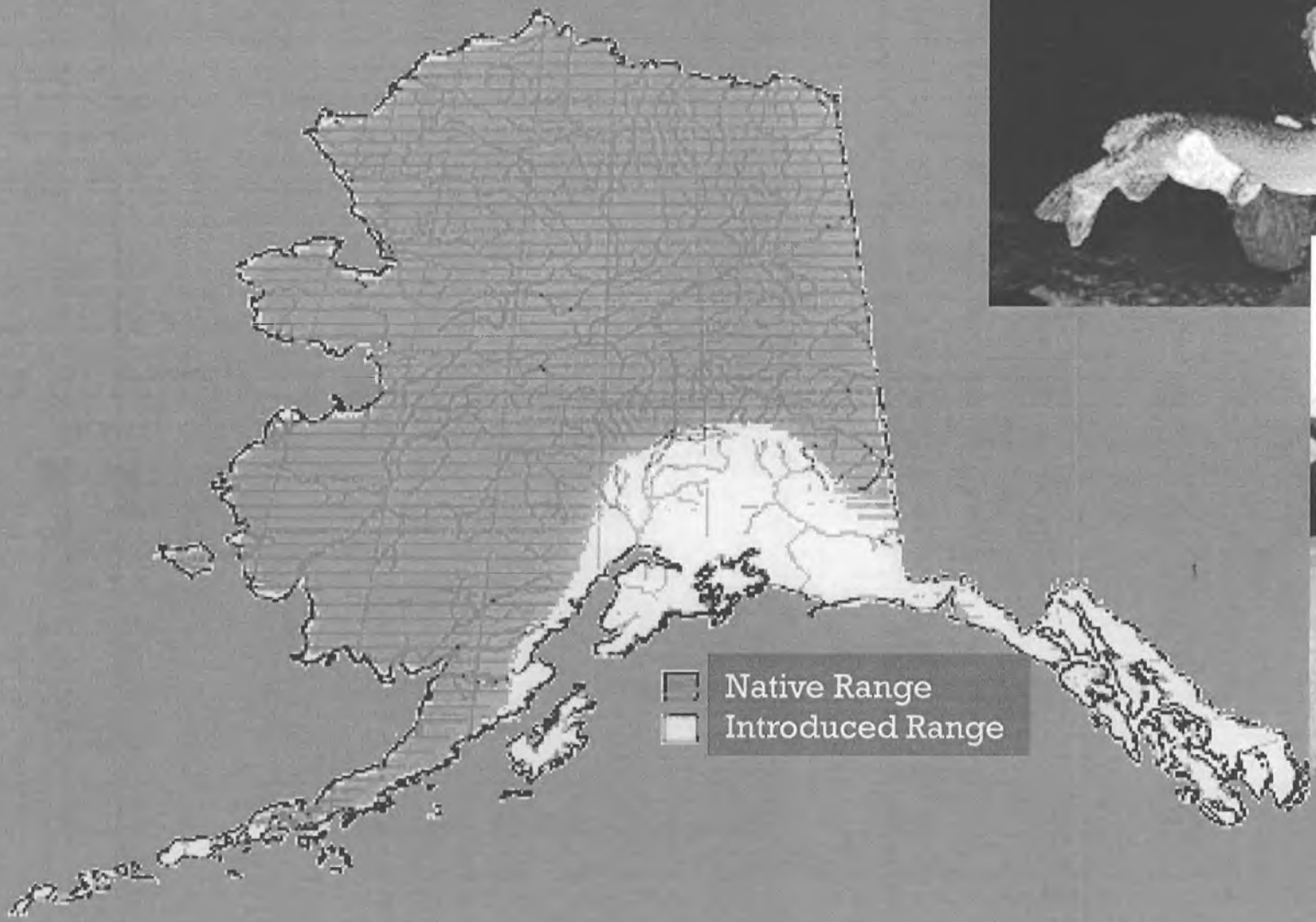
Didemnum vexillum (D. vex) colonial tunicate

Elodea nuttallii (Waterweed) freshwater weed

Also present:

- Botryllid tunicates
- Didymosphenia geminata
- Red-legged Frog

Northern Pike: Native Range



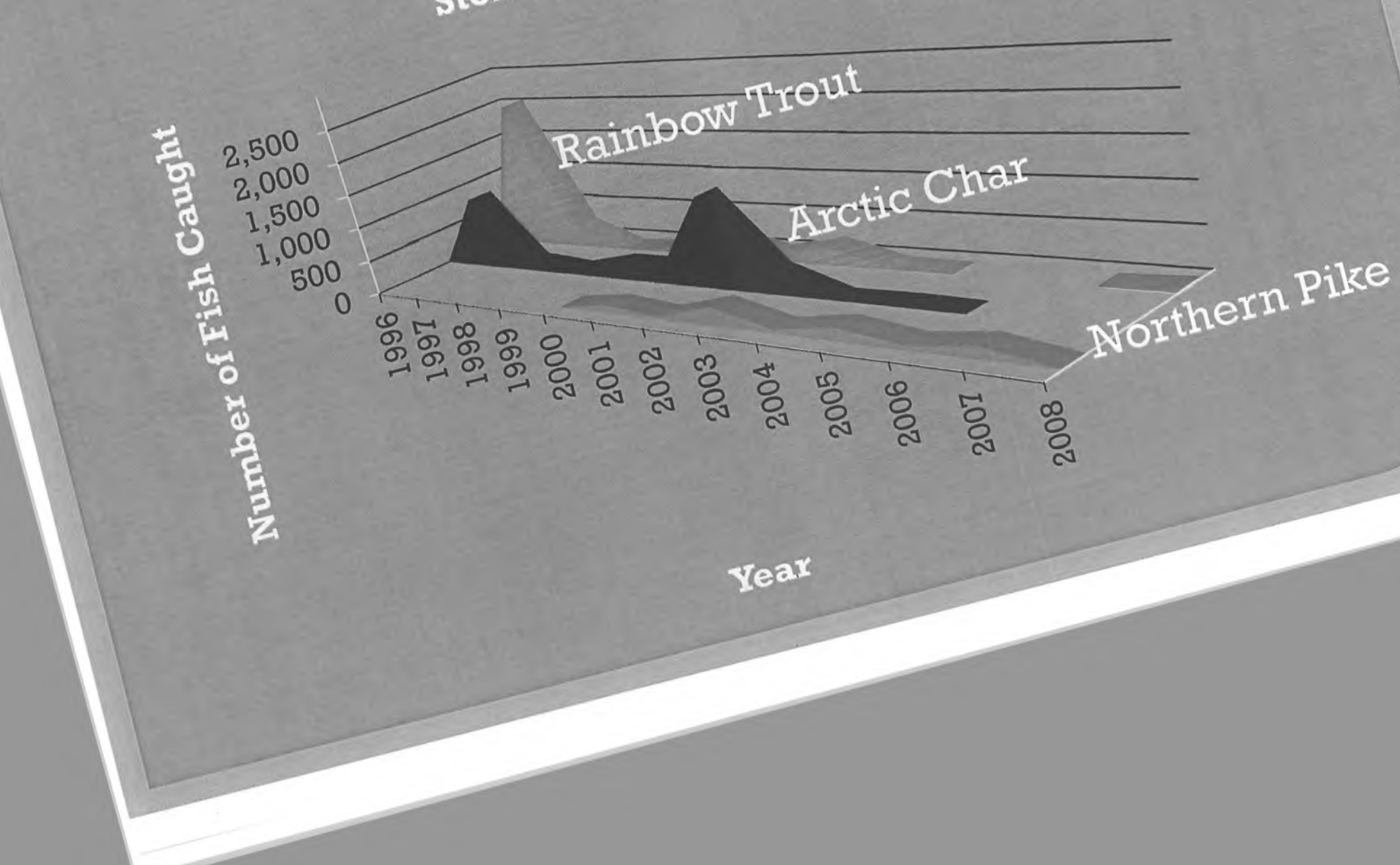
Northern Pike

How do Northern Pike effect native/recreational species Systems within Southcentral effected

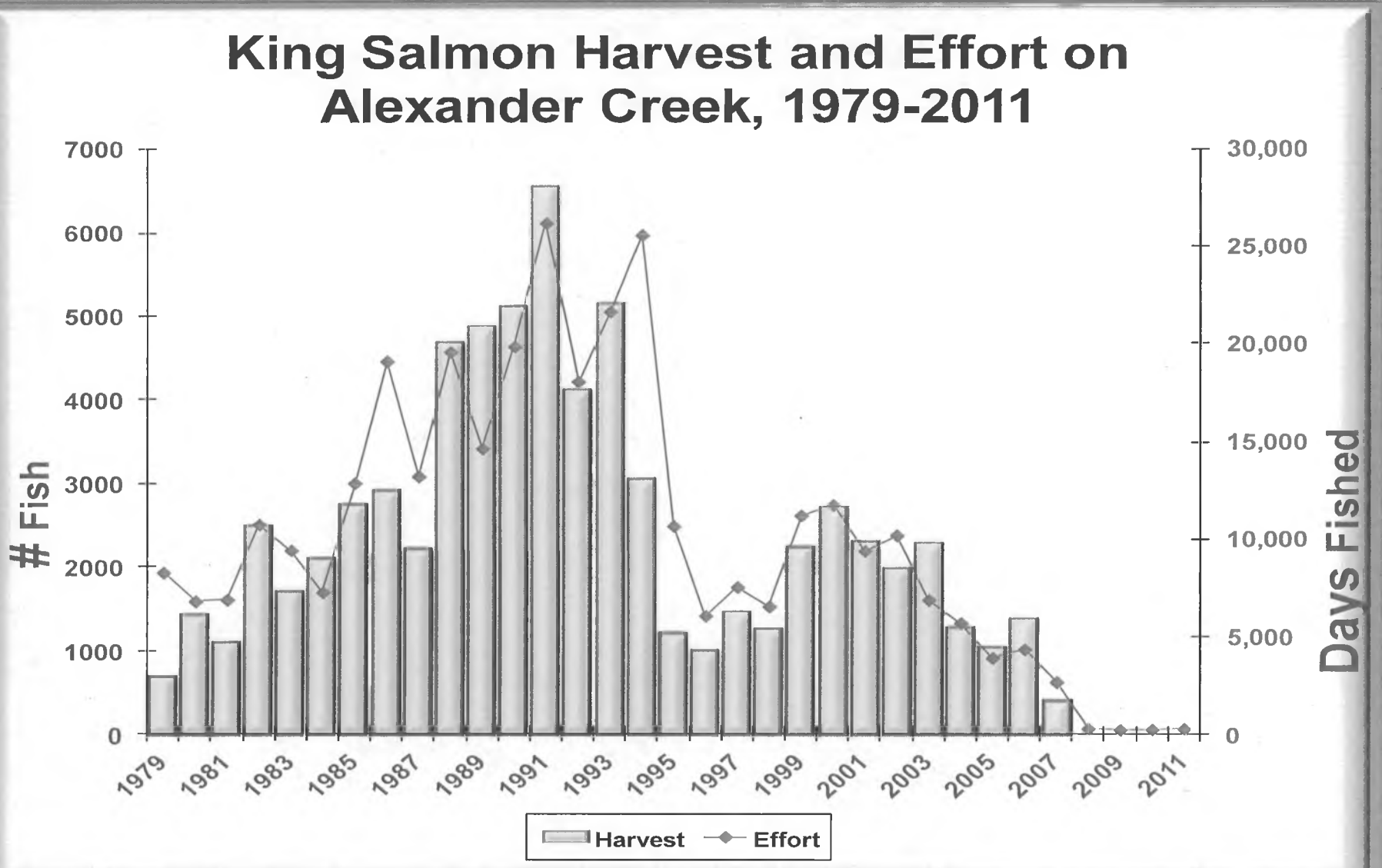
Actions:

- Control-netting
- Change harvest regulations
- Research movement patterns
- Alexander Creek Project

Northern Pike: Consequences



Northern Pike: Consequences



Northern Pike

Actions, continued

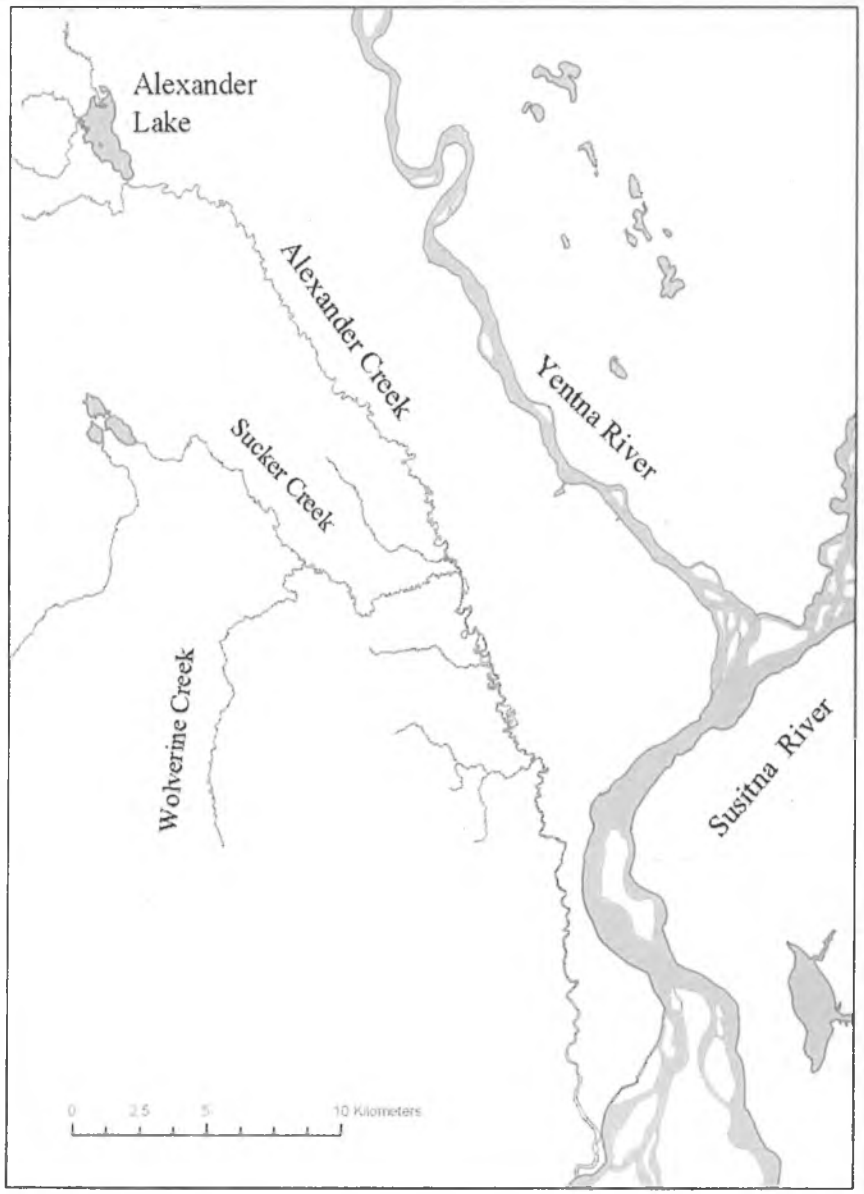
- Eradications
  - Public scoping, permitting, application, monitoring
  - 5 successful thus far
  - 1 Large project in the works- Stormy Lake, Kenai Peninsula

Strategic Planning

- Prioritize future projects
- Work with Military to assist with their eradication projects

Alexander Lake/Alexander Creek

and Side-channel Sloughs



Alexander Creek has supported coho and king salmon fisheries.

- 2008 BOF closed king fishery

First pike caught in Alexander Lake on record was in 1985.

First pike caught in Alexander Creek occurred in 1995.

The system is prime pike habitat.

Goal is to restore salmon populations similar to the 1980's

Northern Pike

Objectives of Project

- Initiate an annual, large-scale gillnetting protocol in side channel sloughs of Alexander Creek to remove spawning northern pike resulting in 60 – 80% reduction in inseason catch rates in targeted areas
- Document movement patterns of pike
- Begin monitoring salmonids in the drainage for long-term evaluation of suppression effort

Northern Pike: What's Next

Stormy Lake rotenone treatment and native fish restoration

Control-netting

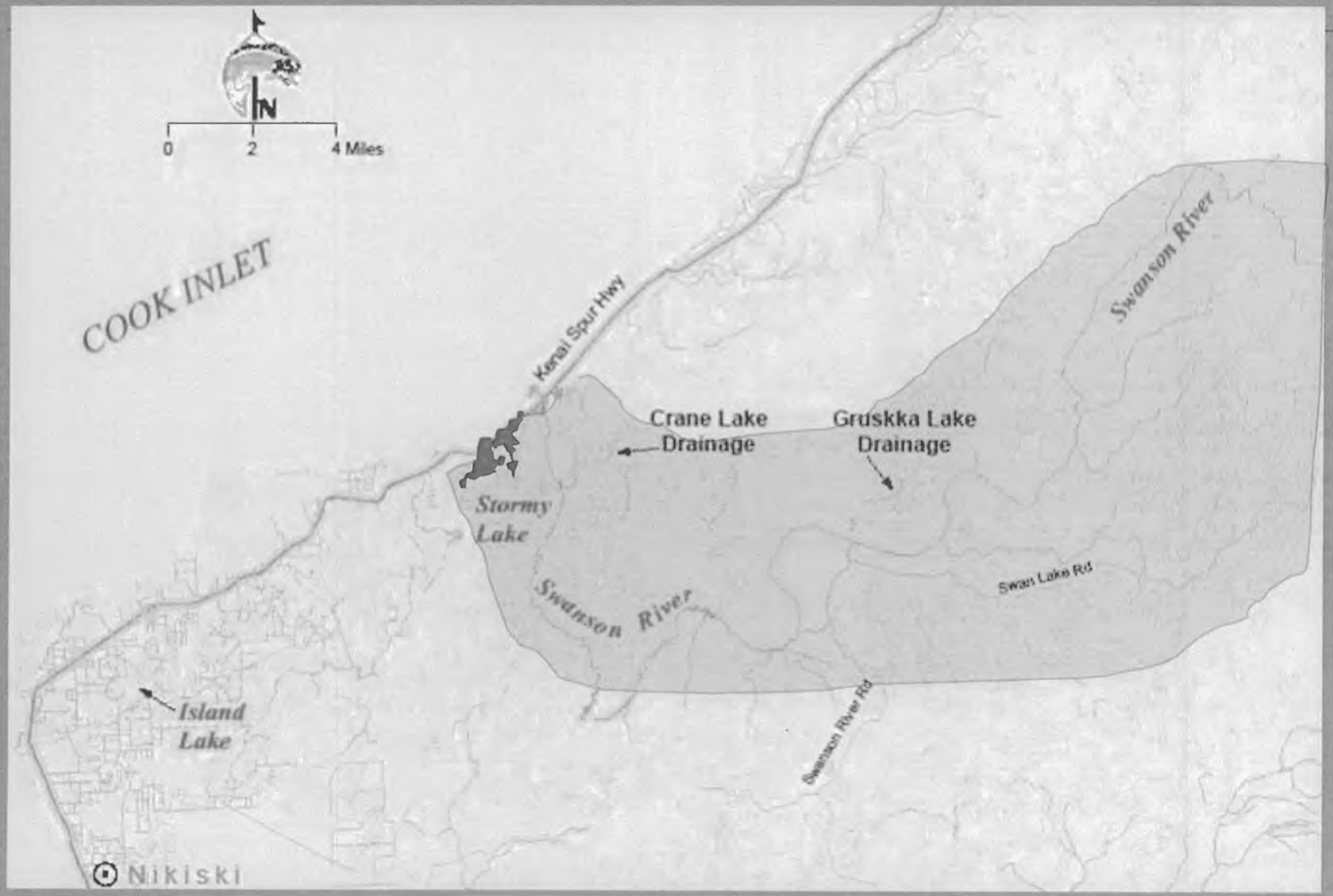
- Cheney Lake
- Alexander Lake/Alexander Creek

Revise Northern Pike Management Plan

Alexander Lake Project to continue- 2015

Target prioritized projects as able

Stormy Lake and Swanson River Drainage



Didemnum vexillum (D.vex)

Colonial tunicate found growing on nets used in the production of oysters

Whiting Harbor is a man-made embayment located adjacent to the Sitka airport and near the USCG base.

D. vex

History

First detected in Whiting Harbor June 2010

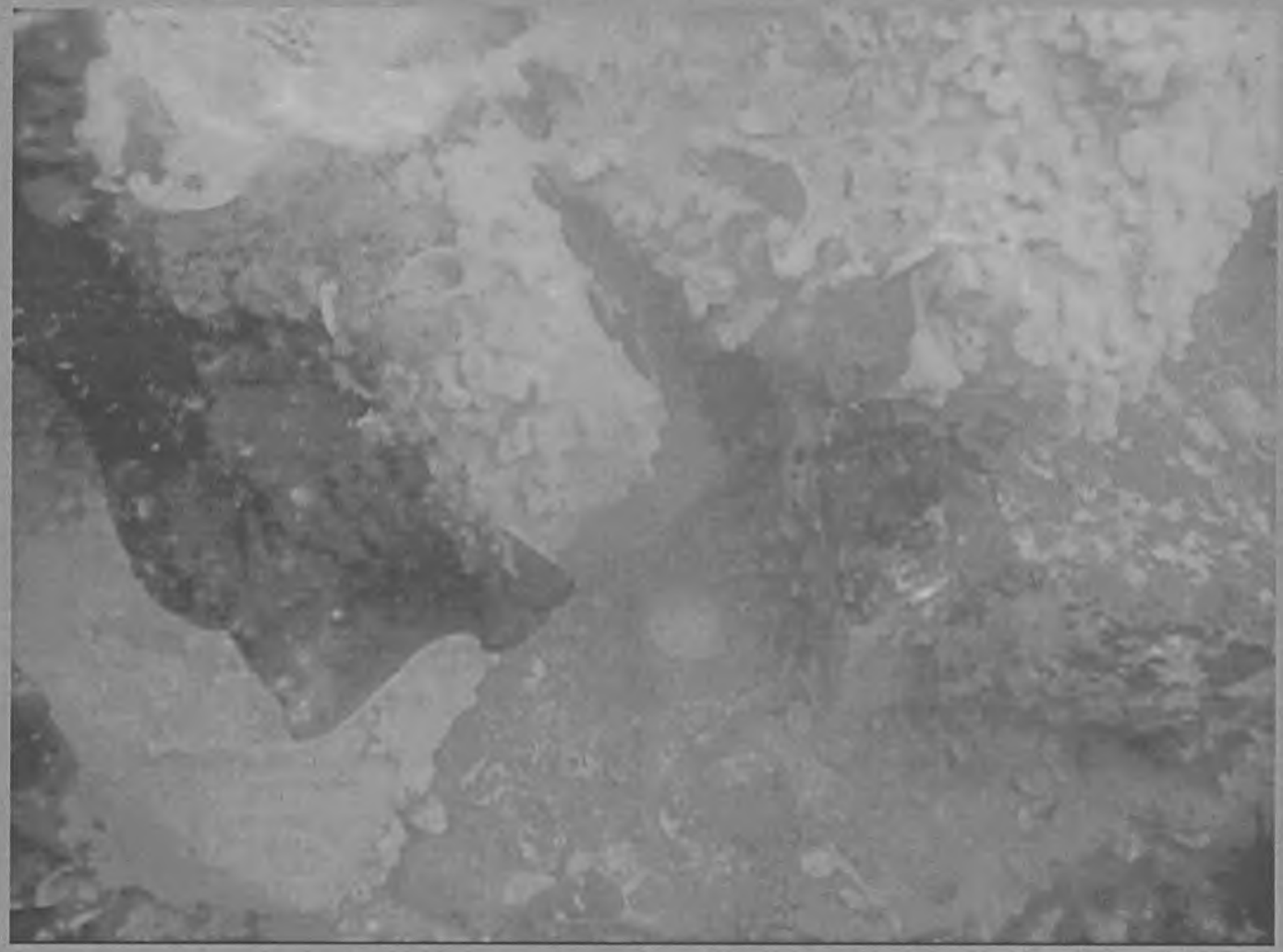
USFWS funds ADF&G to study distribution and develop response plan.

Commercial Fisheries Division divers complete surveys in 09/2010 and 01/2011.

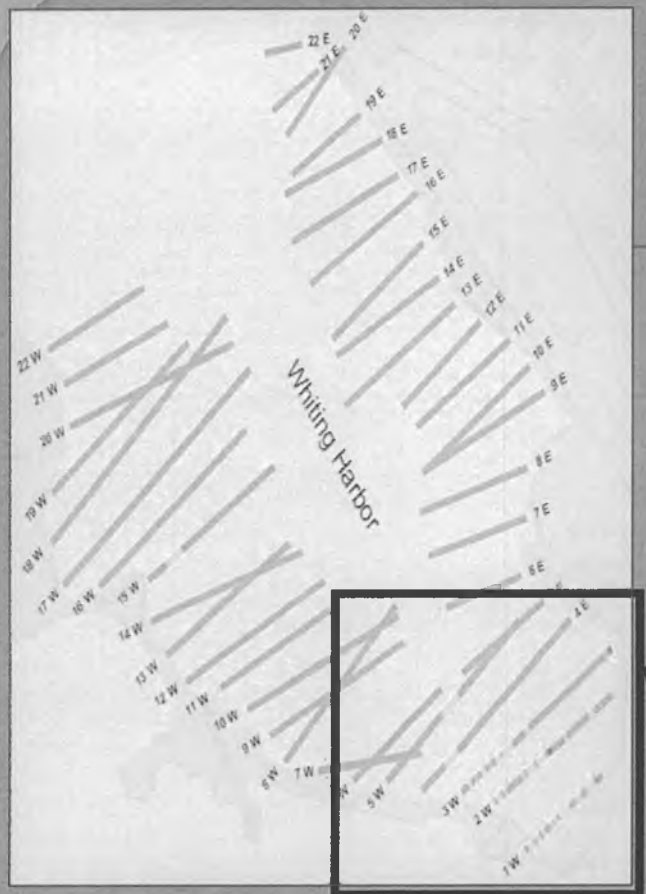
Outreach to aquatic farmers, public- local and statewide, stakeholder groups

Restrict fisheries access and request the public avoid the area.

Didemnum vexillum: a view

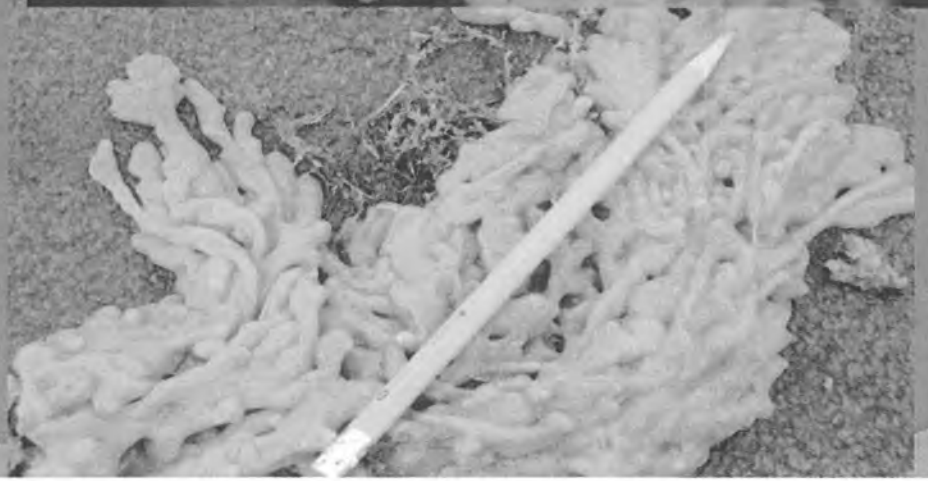


D. vex: Distribution



Percent Cover

- 0
- >0 – ≤5
- >5 – ≤10
- >10 – ≤50
- >50 – ≤100



D. vex

Bag and remove lantern nets: Aug. early Sept. 2011

Fall storm breakup aquatic farm

Major clean up effort to remove all aquatic farm infrastructure from the water, November 2011

Collaborative effort: City of Sitka, DNR, UAS, Sitka Tribe, SERC, SSSC, USFWS, USFS, BLM, USCG, local volunteers

D. vex: Decommissioning

D. vex: What is Next?

Smithsonian Environmental Research Center (SERC) involved in studying the organism, life history, predators, eradication options for natural substrate
Outreach floating materials as a pathway (docks, floats, etc.)
Investigate funding options for full eradication

Anchorage *Elodea*

Photograph by USFWS

Elodea: Waterweed

History

First detected by USFS in September 2010 in Chena Slough.

Fairbanks Soil and Water Conservation District takes on coordination of efforts.

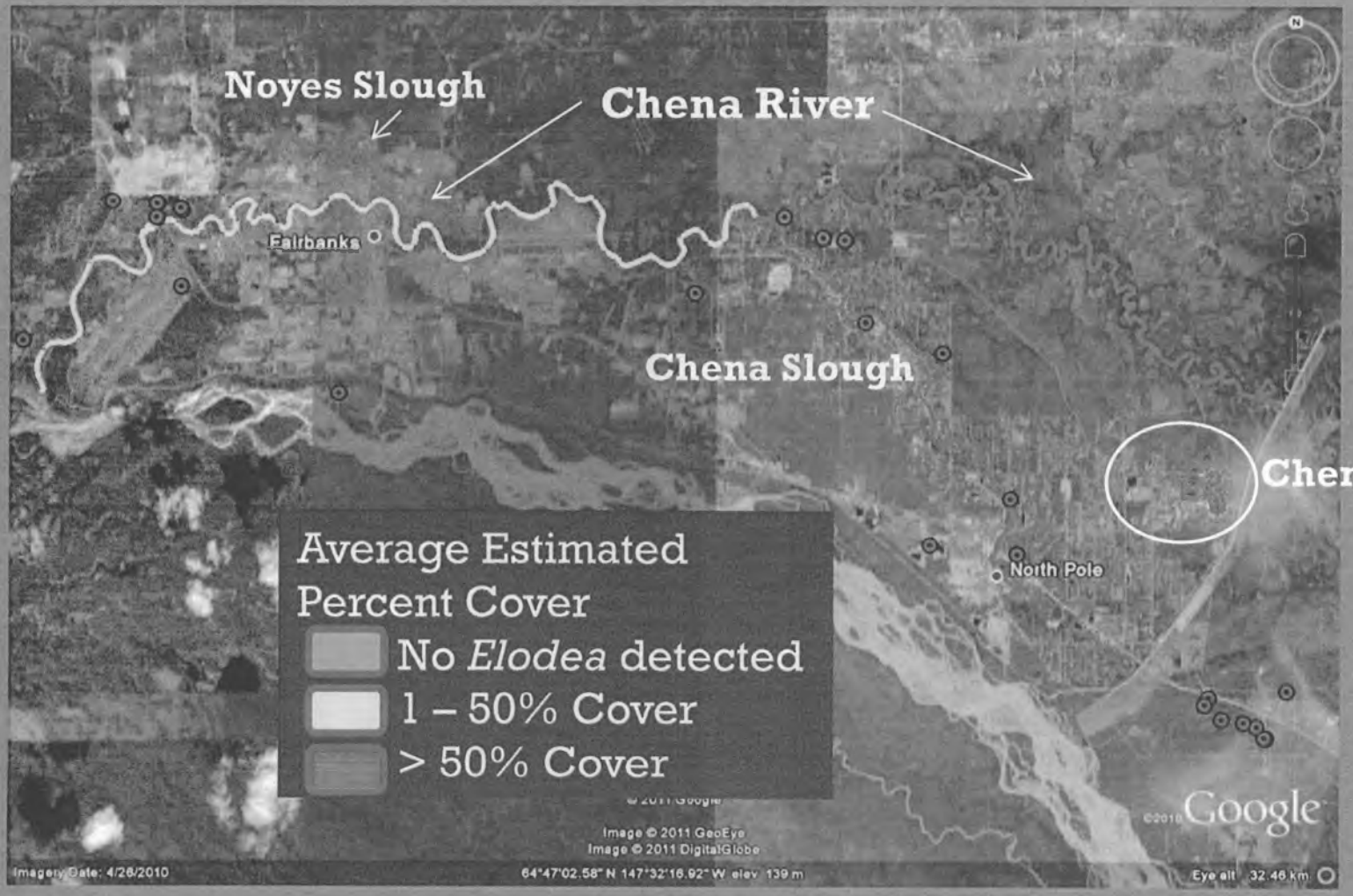
Legislative and USFWS funds support detection, outreach and response activities.

Surveys in Fairbanks of 29 water bodies, collaborative effort, confirm *Elodea* in Chena Lake, and distinct populations in Chena River

Chena Lake is part of the Fairbanks Rec area.

Elodea: Waterweed

FAIRBANKS DISTRIBUTION by PERCENT COVER



Slide- Fairbanks Soil and Water Cons Dist.

Elodea: Waterweed

Shoreline/wading surveys in Southcentral:

- 9 in Anchorage basin- 3 positive
- 4 in Mat-Su area- all negative
- 2 on Kenai Peninsula- negative

USFWS confirmed waterweed in Sand, DeLong and Little Campbell Lakes

Elodea: Sand Lake

Pondweed and *Elodea* along a resident's shoreline

Many residents who live on Sand Lake are floatplane owners.

Elodea: What's Next

Fairbanks Soil and Water Conservation District has AKSSF funding to investigate mechanical control options

Support continued surveys statewide

Outreach to stakeholders importance of cleaning gear to avoid being a vector

Planning and Response

Discussions with UAS to prioritize freshwater systems most suitable to sustain zebra/quagga mussels. Goal to implement Quagga Zebra Mussel Action Plan monitoring

Education and Outreach campaign at high use/high risk systems in Alaska.

- Audio, video, web-based and on-site messaging about species of concern identification, avoid spreading invasive species and reporting

Thank You

- ADF&G staff who worked hard under unusual circumstance
- U.S. Fish & Wildlife Service
- U.S. Forest Service
- NOAA/National Marine Fisheries Service
- Bureau of Land Management
- U.S. Coast Guard, and USCG Auxiliary
- Sitka Tribe of Alaska
- University of Alaska
- Fairbanks Soil and Water Conservation District
- City of Sitka
- Smithsonian Environmental Research Center
- San Francisco State University
- Alaska SeaLife Center
- Sitka Sound Science Center

Volunteers who assist with invasive species actions throughout the state

State of Alaska

Invasive Species

Division of Agriculture

Alaska Department of Natural Resources

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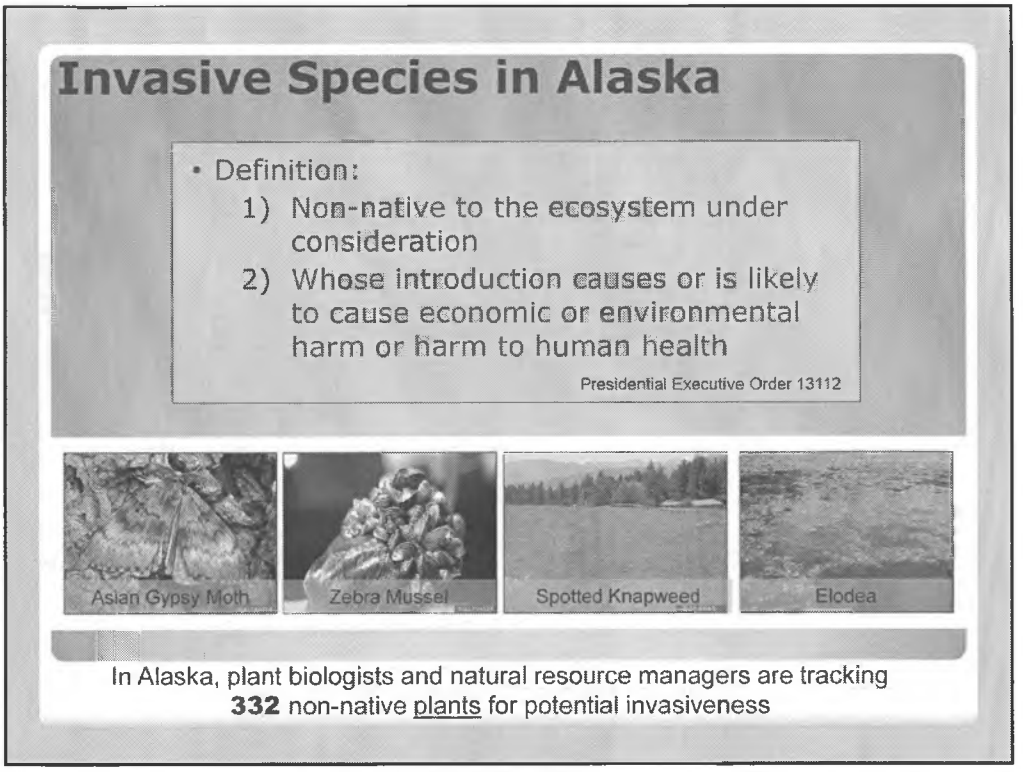


A broadly applicable definition of Invasive Species comes from the Presidents Executive Order 13112 which states that an invasive species is one that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

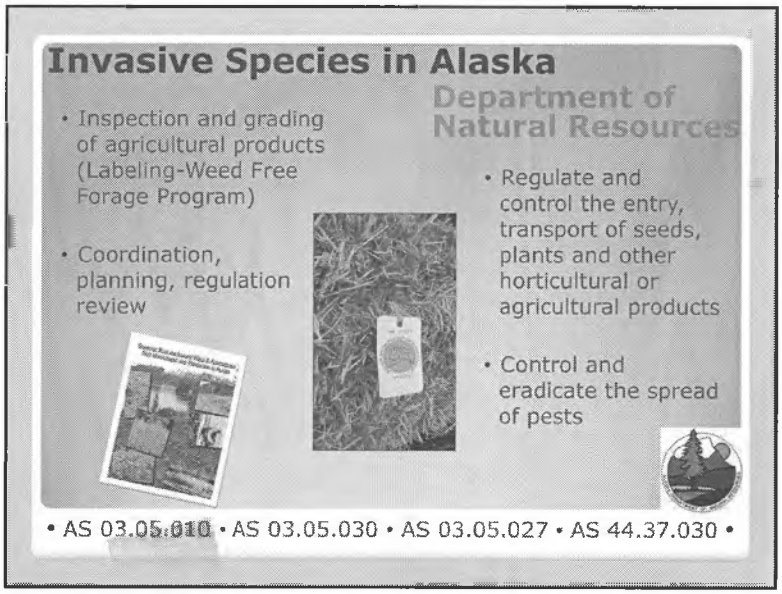
•This definition broadly applies to all taxa including animals, insects and plants

•What makes a non-native plant cross that threshold into a non-native INVASIVE plant is often what exists, or better, what doesn't exist in the ecosystem it is introduced into. Prolific invaders tend to lack some piece of their native habitat or ecosystem that keeps its population in check. Competition by companion organisms, pathogen, climatic factors etc.

From a plant program perspective, as that is mainly what our program focuses on, the key is not to label ALL non-native plants as invasive-this is both exhaustive from a management standpoint and unnecessary. The key is to be aware of the invasive POTENTIAL that a plant may have using information available from other regions experience with the plant, focusing on the most climatically similar locations.

To give you an idea of scope…in Alaska, plant biologists and natural resource managers are tracking 332 non-native plants for potential invasiveness.

**The key is POTENTIAL INVASIVENESS. Not all new species (plants or otherwise) will be an issue. Only a small portion of those "tracked" species may establish in natural areas, and an even smaller portion of those will cause a problem.



The Division of Agricultures Invasive Plant and Agricultural Pest Program is driven by four main program areas:

•Inspection and Grading of Agricultural Products

- •Weed Free Forage and Hay Program: This is a certification process that allows forage and hay producers in the state of Alaska to have their fields inspected and certified so they can sell a Weed Free product to buyers.
  - •Value Added Product (not required by the state)
  - •Program housed by the Soil and Water Conservation Districts with annual Inspector trainings provided through Division of Ag
- •Weed Free Gravel: This is a developing program in Alaska that would operate similarly to the Weed Free Forage and Hay Program. This program would allow some gravel pit operators to produce a value-added gravel product that could be used in areas that are sensitive or that are otherwise weed-free.

•Regulate and control the entry, transport of seeds, plants and other horticultural or agricultural products

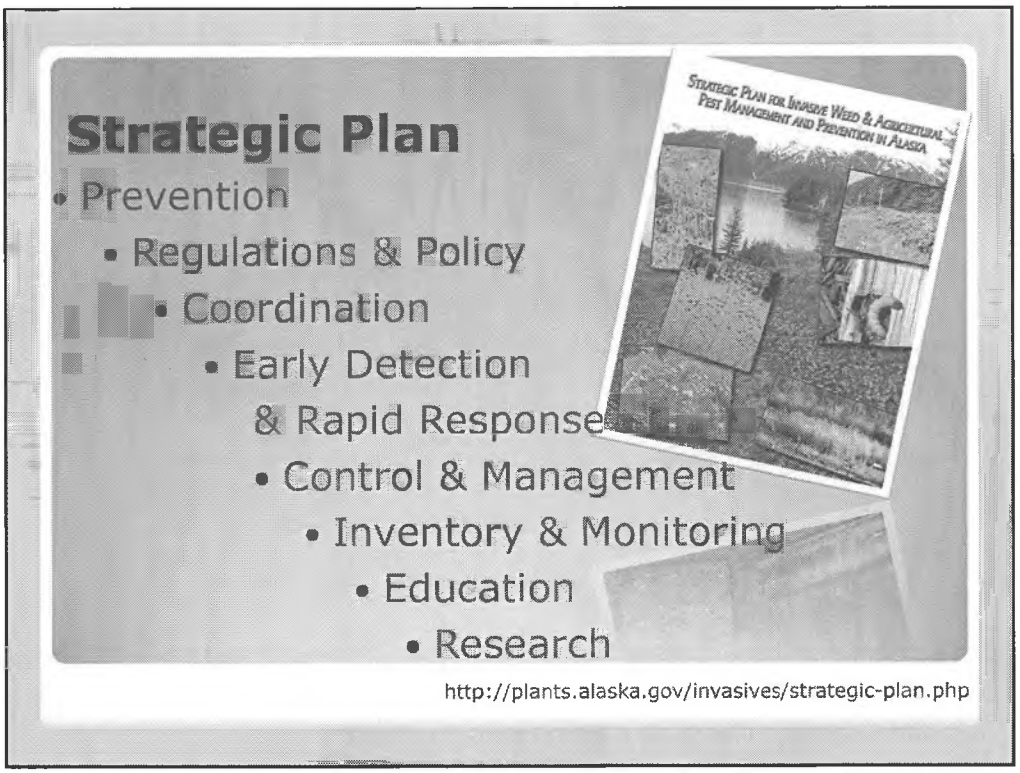
- •Seed Laws, Quarantine Laws, Pest Laws (falls within Division of Ag): Restricted and Prohibited Seed Lists,

•Control and Eradicate the spread of pests: inspections, quarantine, management

•Coordination, Planning, regulation and review:

- •My position: Invasive Weeds & Agricultural Pest Coordinator
- •Strategic Plan
- •Coordination: state departments & agencies, UA CES, AACD, ADF&G

I will go into more detail on the individual projects that fall within each of these program directives.



Published last year, the Division of Agriculture put together a Strategic Plan for Invasive Weed & Agricultural Pest Management and Prevention in Alaska. It was written to help guide prevention and management of invasive species by the DNR and its partners. It includes three main pieces

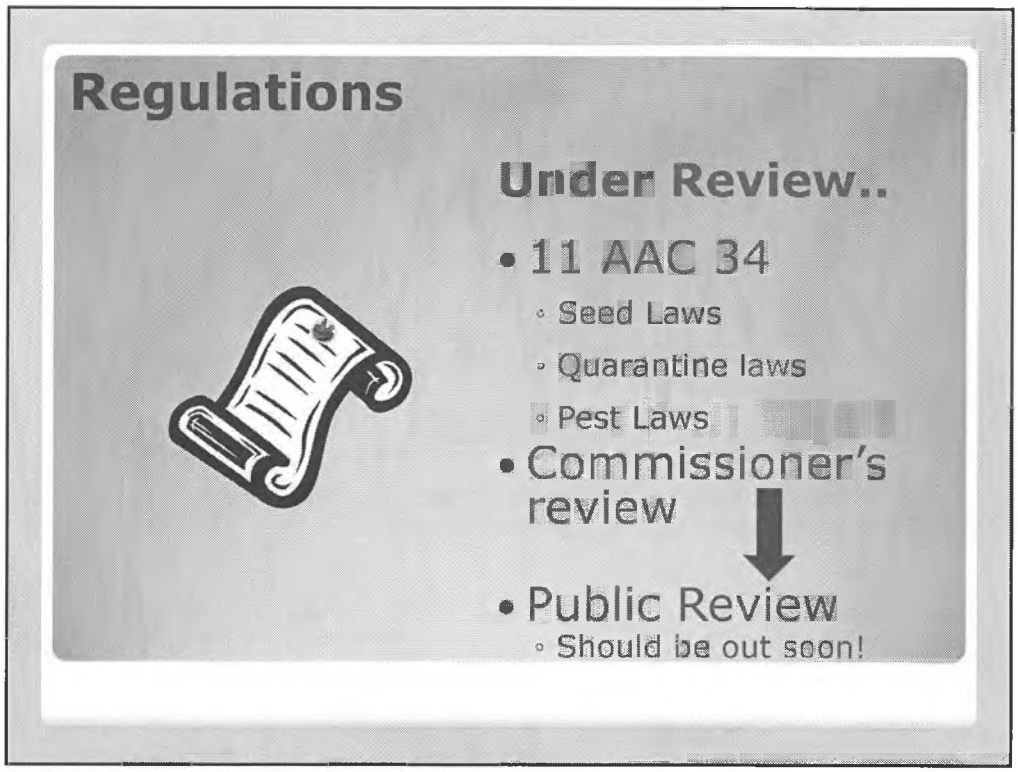
- Objections & Action Strategies
- Annual priorities and goals
- Annual Report→completed goals, highest priority action strategies, emerging issues

This plan allows for flexibility in implementing action strategies and identification of emerging issues that may warrant action before a new plan is written.

Does not cover invasive species covered by other Departments (Fish & Game, DEC)

The Mission Statement: "The Department of Natural Resources manages noxious weeds, invasive plants, and agricultural pests to maintain uninterrupted productivity of natural and agricultural resources."

- Prevention: most critical aspect of invasive plant and ag pest management. Action such as quarantine and inspection



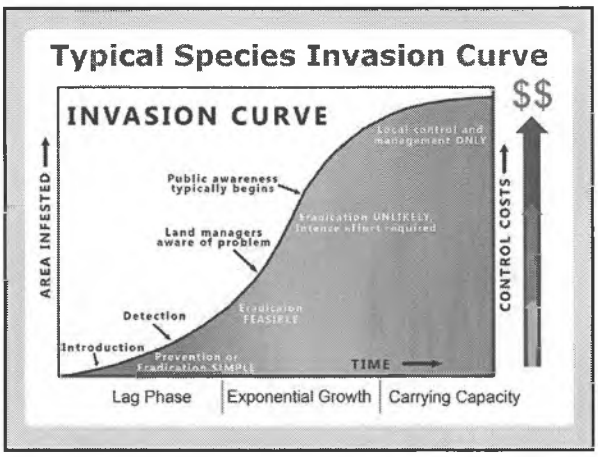
Currently, 11 AAC 34 encompasses seed laws (including prohibited and restricted noxious weed list), quarantine laws and pest laws.

Over the past two years, the Division of Agriculture has evaluated the existing regulations regarding Invasive Plants and Agricultural Pests and have been processing through an internal review

•We've moved to make the regulations more applicable to all invasive weeds and agricultural pests beyond the existing seed regulations.

•Develop process that involves public and stakeholders in identifying species that should be managed by region. This regional process would likely utilize the existing boundaries and experience from the Soil and Water Conservation Districts and other stakeholders.

These amendments are in the final review process awaiting the Commissioner's final approval before the y are available for public review.



This species invasion curve is a common, simplified depiction of the growth of an invasive species in a new environment and it's impact to natural resources over time.

The "invasion" can be broken down into three characteristic phases of growth activity which correlate with specific management approaches and relative estimated cost of those type of management activities.

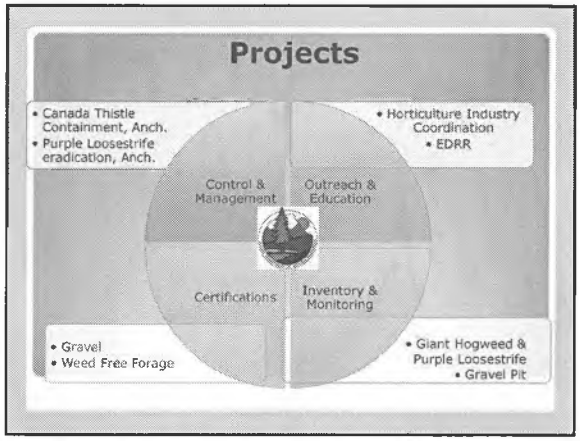
•During the LAG PHASE new species are found, their numbers are small and their ecological impact is relatively low. Management in this phase centers around Early Detection and Rapid response. This is the least expensive time to manage aside from prevention.

•A population enters the GROWTH PHASE and begins to spread quickly, impacting natural resources. As the species grows and disperses, natural resource managers start to take notice and eventually, it becomes visible to the general public as well. This is when, for example, a plant that was once only found in a few disturbed places along the road in Anchorage is now being spotted on off-road trail systems or other wildland areas with more frequency. Management in this phase transitions from simple eradication of isolated populations to a spectrum of feasibility. That feasibility diminishes dramatically as populations expand and as funding is limited.

→Activity in this phase is also what makes a new, non-native species, invasive. Up until this explosion of growth, it is simply a new species. :Many new species may arrive to AK every year but not all exhibit the aggressive growth pattern that we characterize as "invasive."

•An invasive species will eventually reach its ecological amplitude or environmental carrying capacity where it occupies all the space available and has maximized impacts to natural resources. MANAGEMENT in this phase is limited to local control and management ONLY as it is too widespread to consider eradication. Also, given the extent, management will be the most costly and impacts to agriculture, wildlife, recreation etc will be long-lasting.

This concept is important as you look at where we focus our projects and the importance of managing for species that are not YET here.

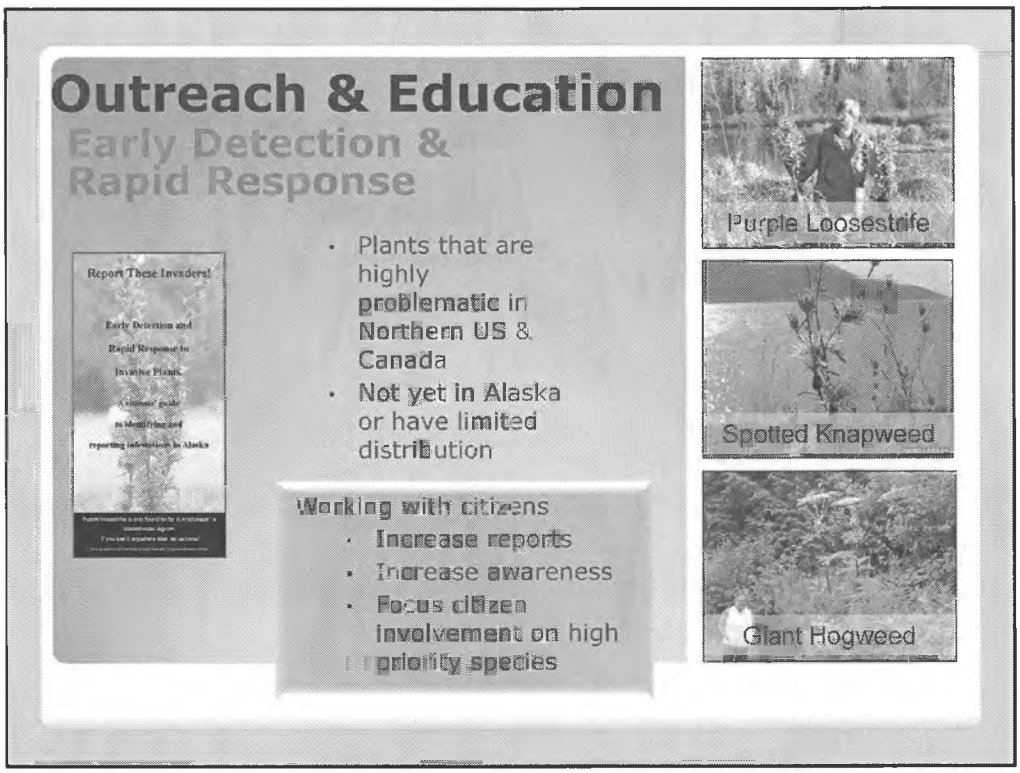


Currently, our Invasive Plant and Agricultural Pest Programs fall within four categories, with many overlapping into multiple areas.

- •Control and Management: this means are actively removing known problems.
  - •Canada Thistle Control
  - •Purple Loosestrife Eradication
- •Inventory and Monitoring
  - •Giant Hogweed and Purple Loosestrife
  - •Gravel Pit
- •Certification
  - •Weed Free Forage
  - •Gravel
- •Outreach and Education
  - •Horticulture industry coordination
  - •Early detection and Rapid Response (EDRR)

Many of these individual programs or projects have elements of the other categories. For example any one of these projects has an education and outreach component included.

We are fortunate in Alaska to have a relatively limited number of invasives to manage. It is common for weed coordinators from other states to comment that we are where they were 20 years ago and they wish they could have acted more swiftly and decisively to prevent some of the agricultural and economic losses they have seen since. This is largely due to the geographic and climatic barriers that we all know and love. It is also due to the large percentage of our land remaining wild and free of highways and people. As we grow, as a state, there are more and more opportunities for invasives to take hold in Alaska.



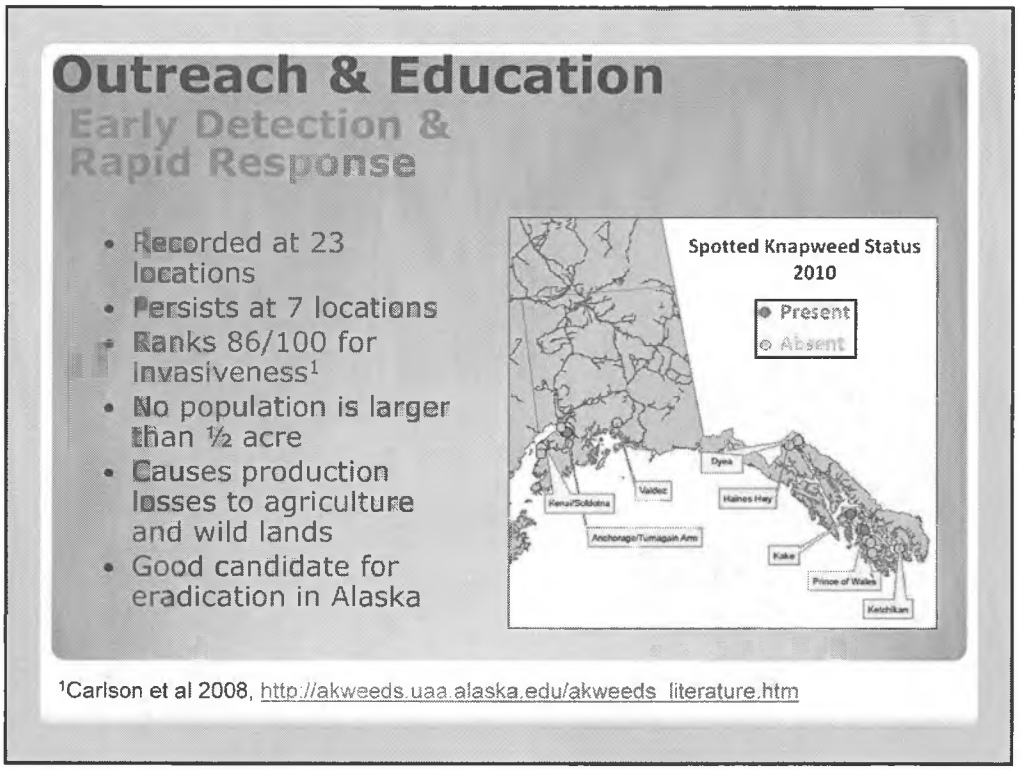
Currently, we have the opportunity to largely focus on Early Detection and Rapid Response (EDRR) , education and other management tools that fall within the early stages of the invasion curve.

- Surveying for new species
- Eradicating small populations manually
  - Purple Loosestrife
  - Spotted Knapweed
  - Giant Hogweed

The EDRR program focuses on these and other species that have been known to exhibit highly invasive and noxious behavior in other similar, or adjacent regions. They are either not yet present in Alaska, or have a very limited distribution. They are the bad players; the species known to cost other states millions of dollars to manage.

This program focuses on outreach (the brochure is shown here) that is geared towards the general public and encourages citizen reporting. These brochures have information on how to identify these high priority species, possible look-alikes, and directions on how to report.

The citizen report helps in the Early Detection part of the program, but a key component is the Rapid Response. Recent "rapid response", and ongoing efforts within the Division of Agriculture have involved removing the one known population of purple loosestrife in Anchorage and one known population of Giant Hogweed in South East.



A more large scale Rapid Response program that was undertaken in 2009 and 2010 involved the eradication of a particularly damaging species: Spotted Knapweed. Outside of Alaska, Knapweed is known to form dense stands reduceing forage quality for livestock and wildlife. The knapweed family of plants are known to be allelopathic which contributes to its success at forming dense colonies-excluding other plants. Other states including Montana, Wyoming, Oregon and Washington have extensive infestations of spotted knapweed which are estimated to cost millions of dollars annually to control.

This species, while present in the state, is a good candidate for eradication because it is not widespread and the infestations are still relatively small.

In 2009 and 2010, Division of Agriculture staff traveled to each known location and mechanically removed plants. By 2010, only 7 infestations persist and they are monitored each year.

In 2011 a new population of spotted knapweed was identified near Jonesville Mine. Plans for control and further inventory are being made for summer 2012.

•Developing surveys that approach each species individually so we can get a sense of what is a problem in what region. This will allow us to develop outreach materials that the horticulture industry would like to see and provide to their customers.

Upcoming goals..

-Continue surveys to develop a regional list of species that are of concern for the horticultural industry

-Identify where outreach information is desired and can be provided

Forest Service

Canada thistle is considered a noxious weed in 35 states, including Alaska. Canada thistle is widespread in Anchorage, but has a limited distribution across the whole of South Central Alaska. The vast majority of the infestations within Anchorage are small but are capable of becoming a source for the spread of new populations to the areas surrounding Anchorage. The Mat-Su valley is an agricultural area with very little canada thistle present, and the Kenai Peninsula already has Canada thistle in its sights as a species for eradication. Not to mention to many natural areas directly adjacent to Anchorage, which, if it were to become established, Canada thistle could negatively impact natural resources, wildlife and recreation.

The goal of this project is to contain the existing populations and create a management plan for Canada Thistle in the Anchorage CWMA.

Control & Management

- Prioritize infestations
- Control:
  - Coordinated DOT mowing roadside infestations
  - Manual removal of small (contain)
  - Pursuing DEC permit for herbicide application

Canada Thistle Containment, Anchorage

Prioritize infestations based on their location either along or in close proximity to:

- Highways headed out of Anchorage
- State and federal lands
- Greenbelts
- Proximity to waterways
- Size

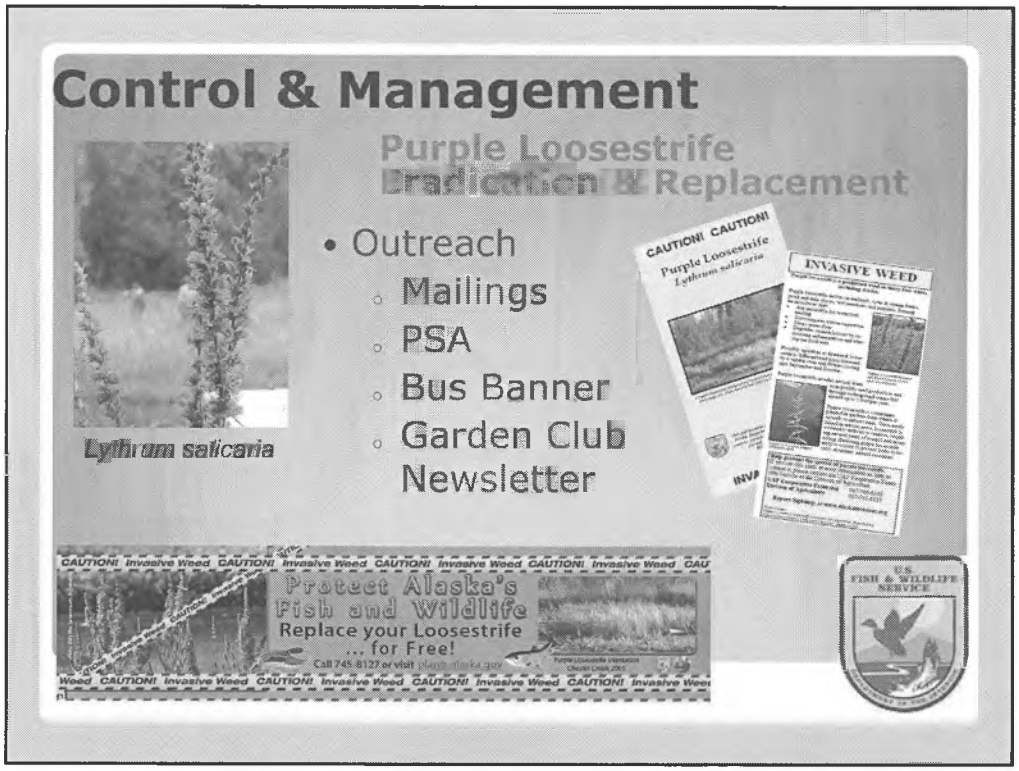
These factors all represent potential pathways for additional contamination.

Upcoming goals…

-Start working on Pesticide Use permits for sites that are in the ROW and have the potential for being treated.

-Work with DOT to continue mowing throughout the season to prevent seed production

-Completing the Canada Thistle Management plan for Anchorage



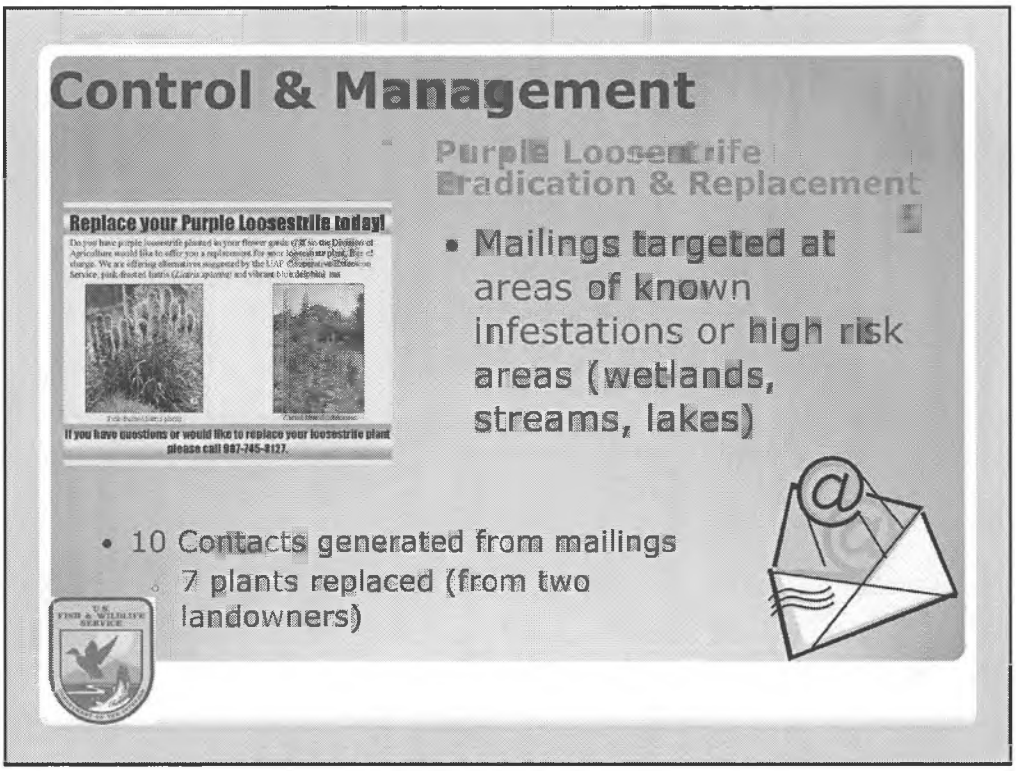
With funding from USFWS, the Division of Ag worked within the Anchorage area to get rack cards and other means of outreach to the community about the threat that Purple loosestrife or Lythrum salicaria poses to wetlands and streams. This outreach took the forms of mailings, Public Service Announcements, a bus banner that could be seen driving the streets of Anchorage, and other newsletters.

Using surveys performed by the UAF CES, mailed outreach was targeted at the landowners of known plantings, the areas directly around those plantings, and potential at risk areas including neighborhoods surrounding streams and wetlands.

The Division of Ag recognized the potential threat that loosestrife poses to natural resources in Alaska if it allowed to persist and spread. Purple loosestrife is listed on the state prohibited noxious weed seed lists prohibiting the sale and transport of loosestrife seeds in the state. This project offered a Non-regulatory approach to provide the opportunity for the state to partner with landonwers in preventing the spread of loosestrife to valued ecosystems.

Upcoming goals...

-Outreach



In 2010 and 2011 a directed mailing was sent which included a card offering to replace your loosestrife, free of charge, with CES suggested alternatives.

A total of 10 contacts were generated through the mailings…

2010: 4 contacts made through mailings

2011: 6 additional contacts

All in all, 7 plants were replaced at two different locations

Control & Management

Elodea

Impacts

- Degrade Fish Habitat and displace native flora and fauna
- Make boat travel difficult and reduce recreation opportunities
- Endanger safe float plane operation
- Alter freshwater habitats, including decreased flow and increased sedimentation

Elodea was discovered growing aggressively in Chena Slough in 2010. Surveys in 2011 found it growing extensively in 3 Anchorage Lakes as well

- Delong Lake
- Sand Lake
- Little Campbell Lake

FAIRBANKS SOIL & WATER CONSERVATION DISTRICT

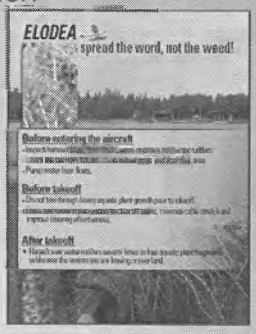
Control & Management

Elodea

Control Trials

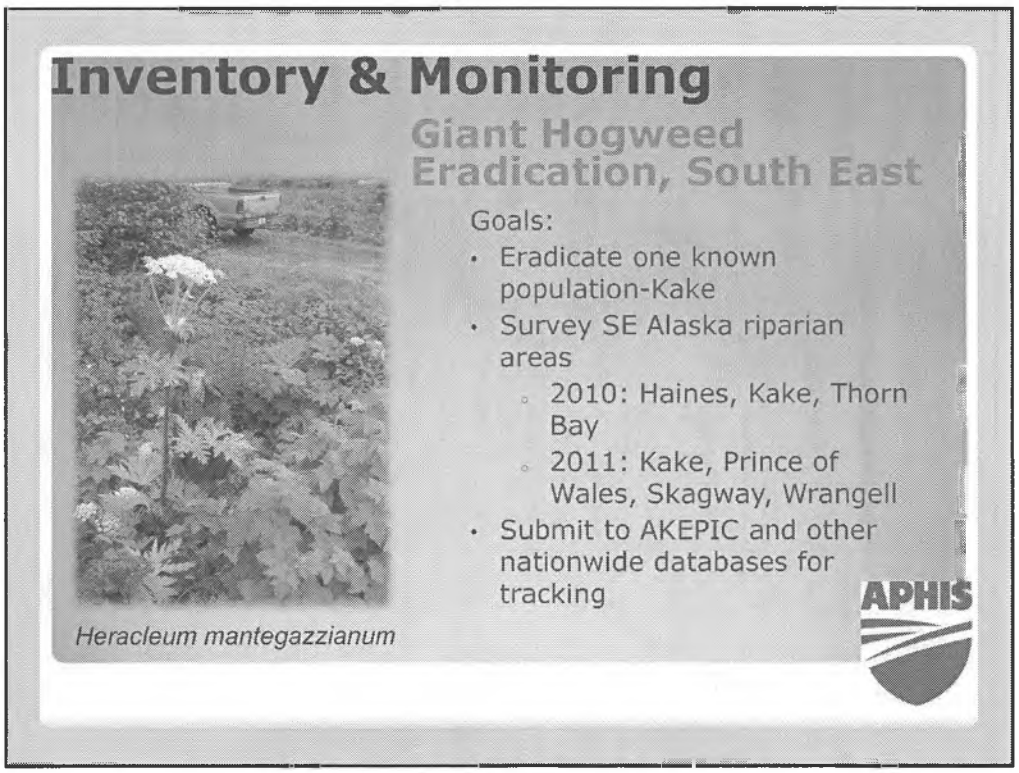
- Manual Removal (divers)-pictured above
- Suction Dredge
- Chemical Application

Outreach



Coordinated Statewide Management

FAIRBANKS SOIL & WATER CONSERVATION DISTRICT



Project Goals:

Ensure early detection and timely response to infestations of giant hogweed along priority salmon spawning waterways adjacent to human settlements in in SE Alaska.

-First known population in Alaska found in Kake in 2010. The landowners were cooperative with removal.

-Monitor population each season

-Inventory other SE areas for Giant Hogweed:

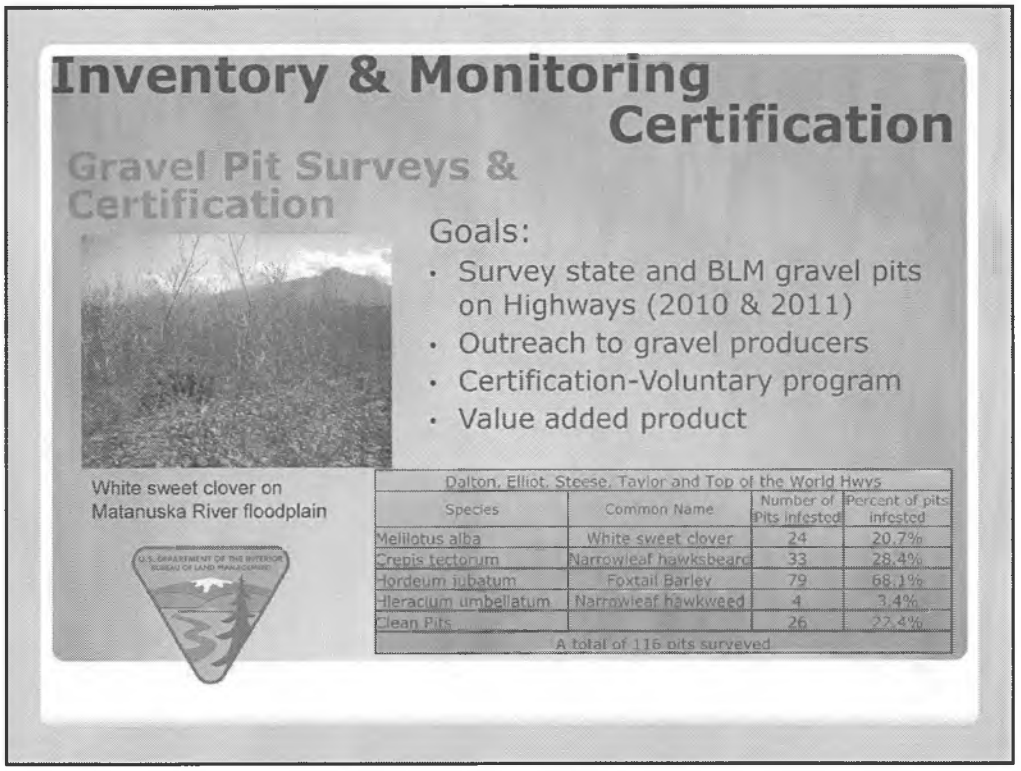
2010: Haines, Kake, Thorn Bay

2011: Kake, Prince of Wales, Skagway, Wrangell

The first known infestation of purple loosestrife was detected in 2005 on a waterway in an Anchorage city park. Giant Hogweed was first found growing in Alaska in 2010. Both species have been identified at the state or Federal level as species of concern.

Continued survey's for both Purple Loosestrife and Giant Hogweed but expanding from Anchorage and South East to the Mat-Su Valley and Kenai Peninsula.

-Continued outreach for these EDRR species



BLM funding

Inventory gravel pits for invasive weeds and colonizing native species to determine what weeds are an issue in gravel pits, and what native plants may be early colonizers to assist in revegetation. Gravel has a high probablility of being a primary vector of invasive plants, this project aims to identify which invaisve plants are common issues. This information will be used to implement a weed free gravel certification program based on standards developed by the North American Weed Management Association and tailored to Alaska.

The Dalton, Elliot, Steese were done in 2010
Taylor in 2011 (Fairbanks Soil & Water)
Certification using NAWMA (North American Weed Management Association)

Upcoming goals...
-Adopt inspection protocol for certifying gravel as weed free
-develop list of weeds that are not allowed for certification

Inventory & Monitoring Certification

Weed Free Forage & Hay

- Voluntary program established for 6 years
- Value added product
  - Revegetation/Erosion control
  - Mushing
  - Backcountry horse riding
- Field inspector training held annually

Field inspections hosted by SWCDs across the state

The Alaska Invasive Species Working Group and the Committee for Noxious and Invasive Plants Management hold a joint conference each Fall to discuss projects, goals and challenges.

Coordination

- AKEPIC (Natural Heritage Program)

Tracking & Ranking Non-native plant species in Alaska

http://aknhp.uaa.alaska.edu/botany/akepic

Any Questions?

Division of Agriculture

Alaska Department of Natural Resources

Brianne Blackburn
(907) 745-8785
Brianne.Blackburn@alaska.gov

Didemnum vexillum (Dvex) in Sitka, AK

Prepared for House Resources Committee
1/23/2012

Marnie Chapman
University of Alaska Southeast - Sitka Campus
1332 Seward Ave., Sitka AK 99835
907-747-7702

Acknowledgements

- Alaska Department of Fish and Game
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- National Oceanographic and Atmospheric Administration
- San Francisco State University Romberg Tiburon Center for Environmental Studies
- Sitka Tribe of Alaska
- Sitka Sound Science Center
- US Coast Guard and Coast Guard Auxiliary
- US Fish and Wildlife Service
- **All the people in Sitka and outside of Sitka that have come together to support this project**

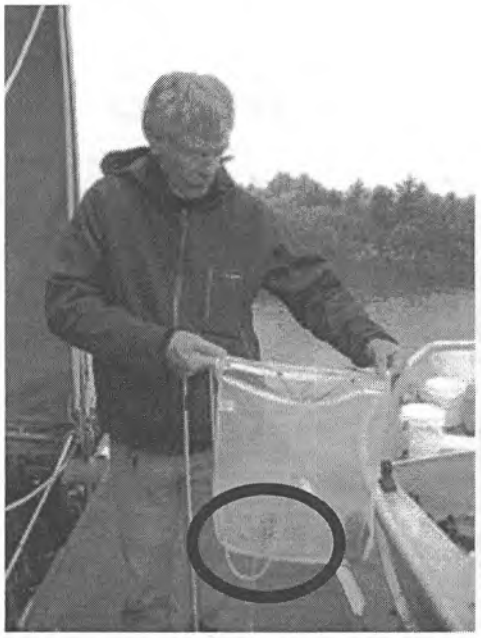
Dvex in Sitka

- Explosive growth and potential for spread
- Whiting Harbor infestation
  - First contain, then eradicate.
- Reduce possibilities for reintroduction
- Learn more about the biology of Dvex and potential impacts in Alaska

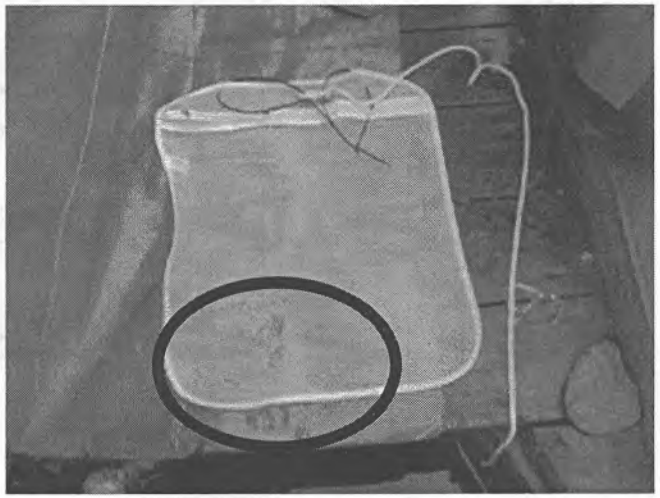
Growth Over 10 Week Period

Appearance on 6/24/11

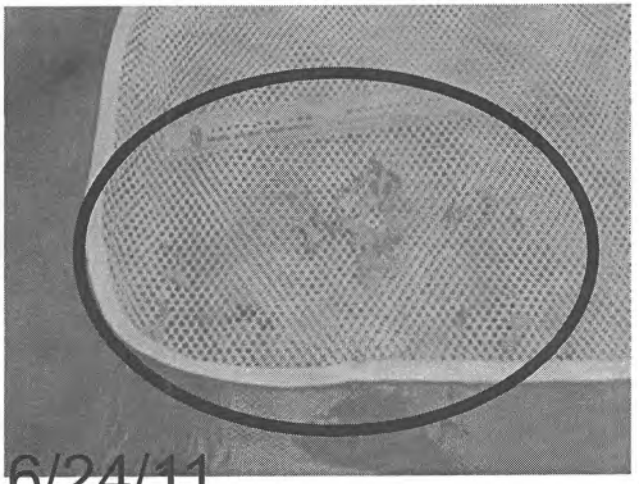
Whiting Harbor, Sitka, AK



6/24/11



6/24/11

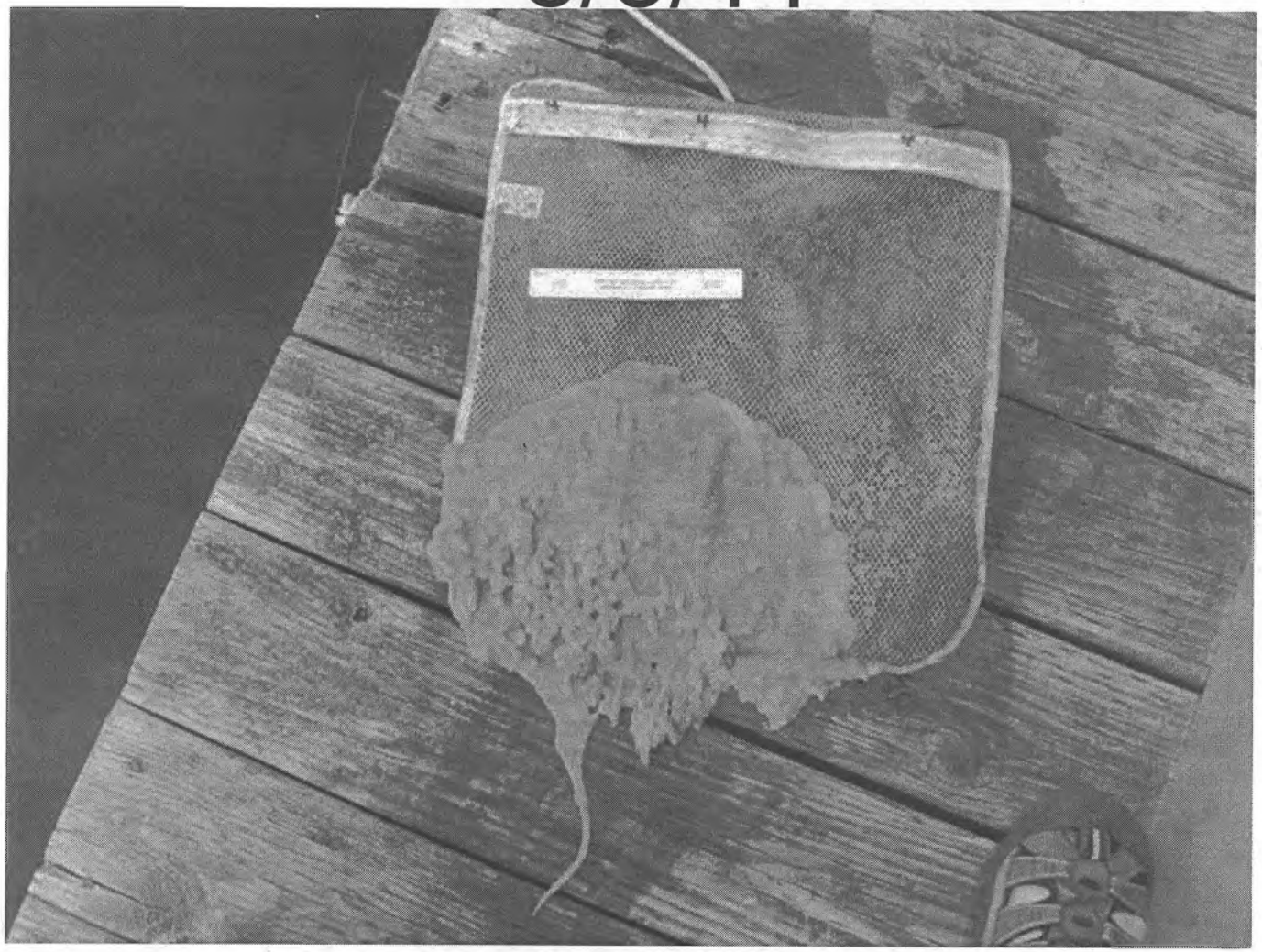


6/24/11

7/9/11

7/22/11

8/5/11



8/16/11

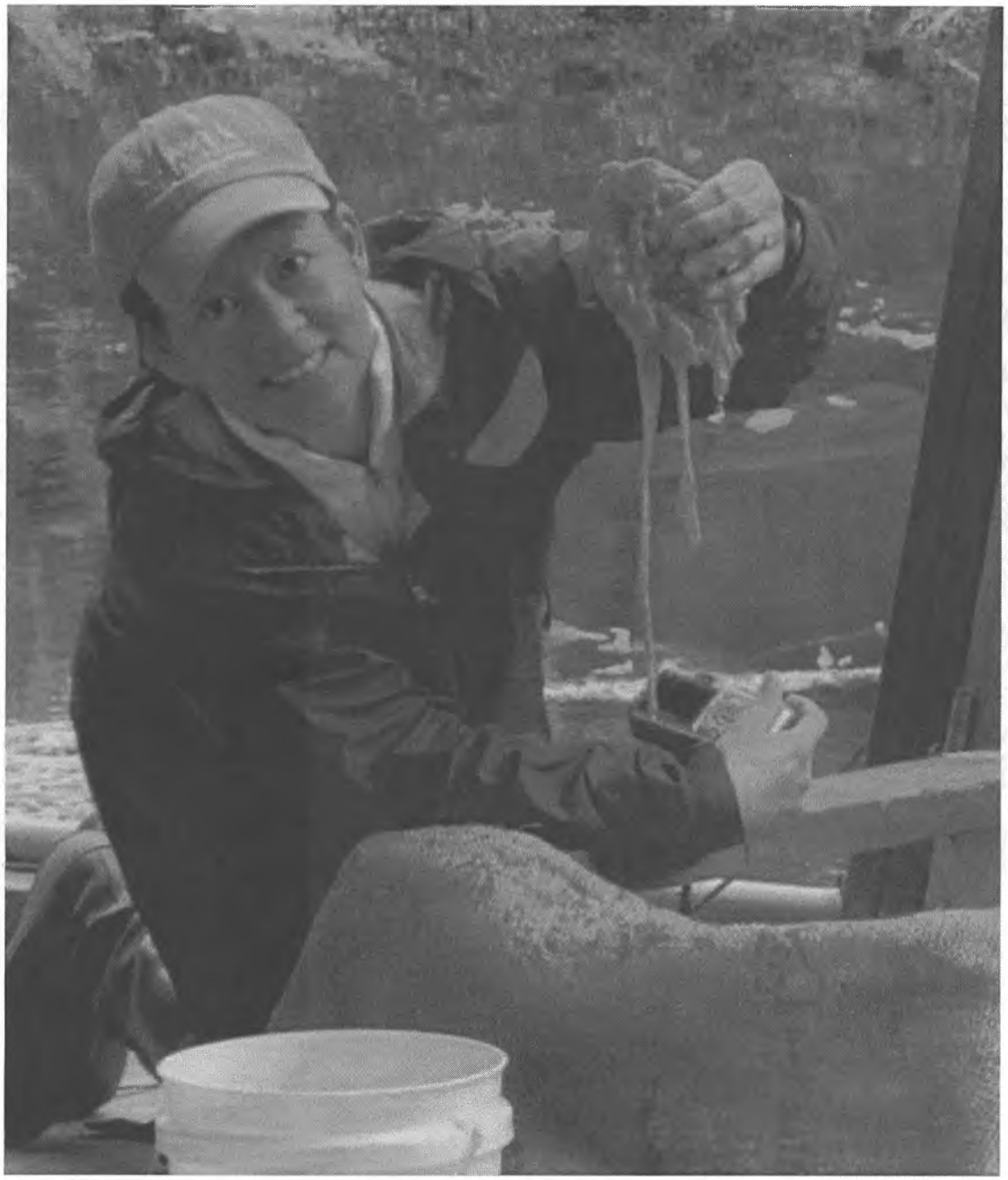
9/1/11

6/24/11
(10 weeks previous)

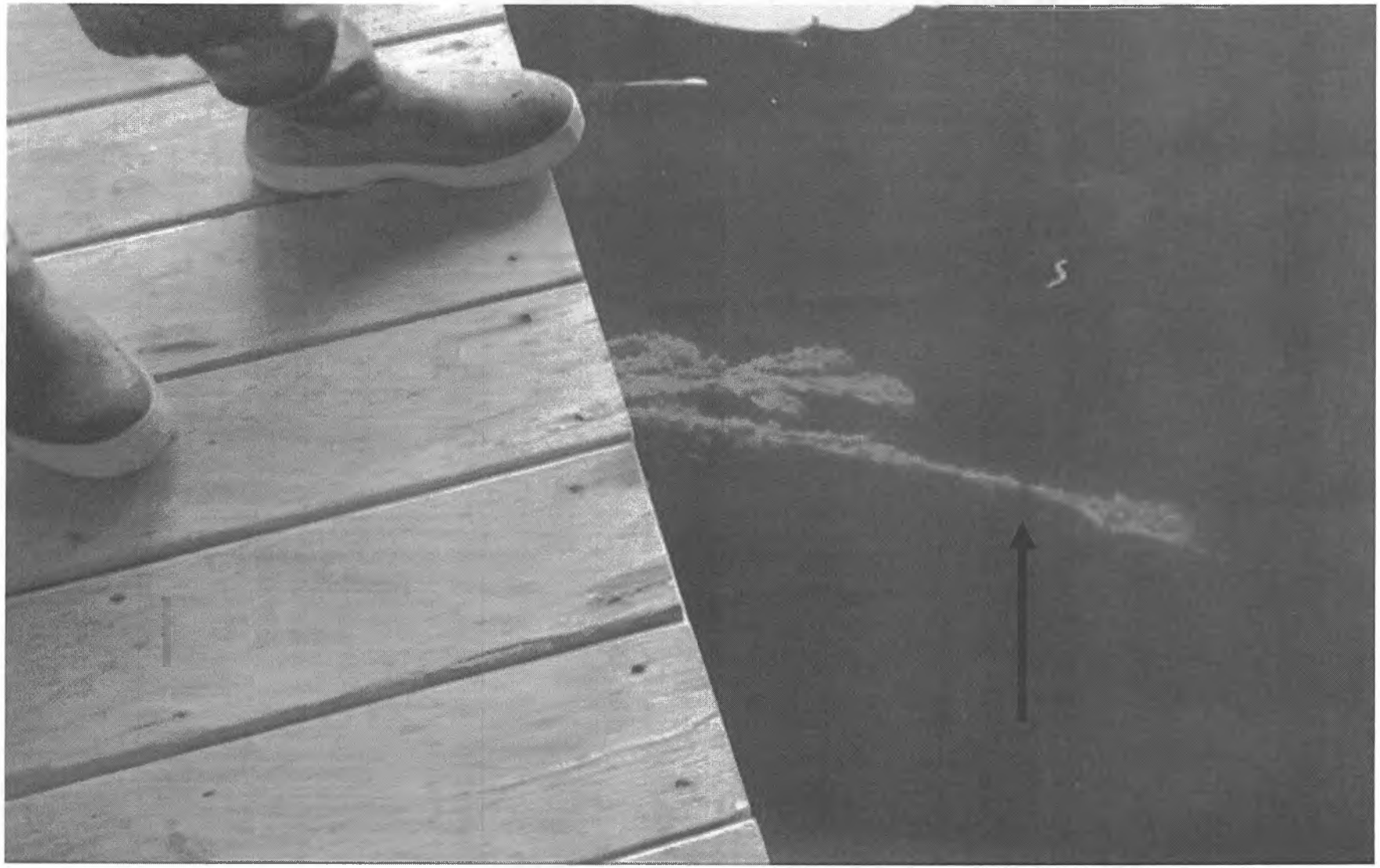
9/1/11

“Dangles”

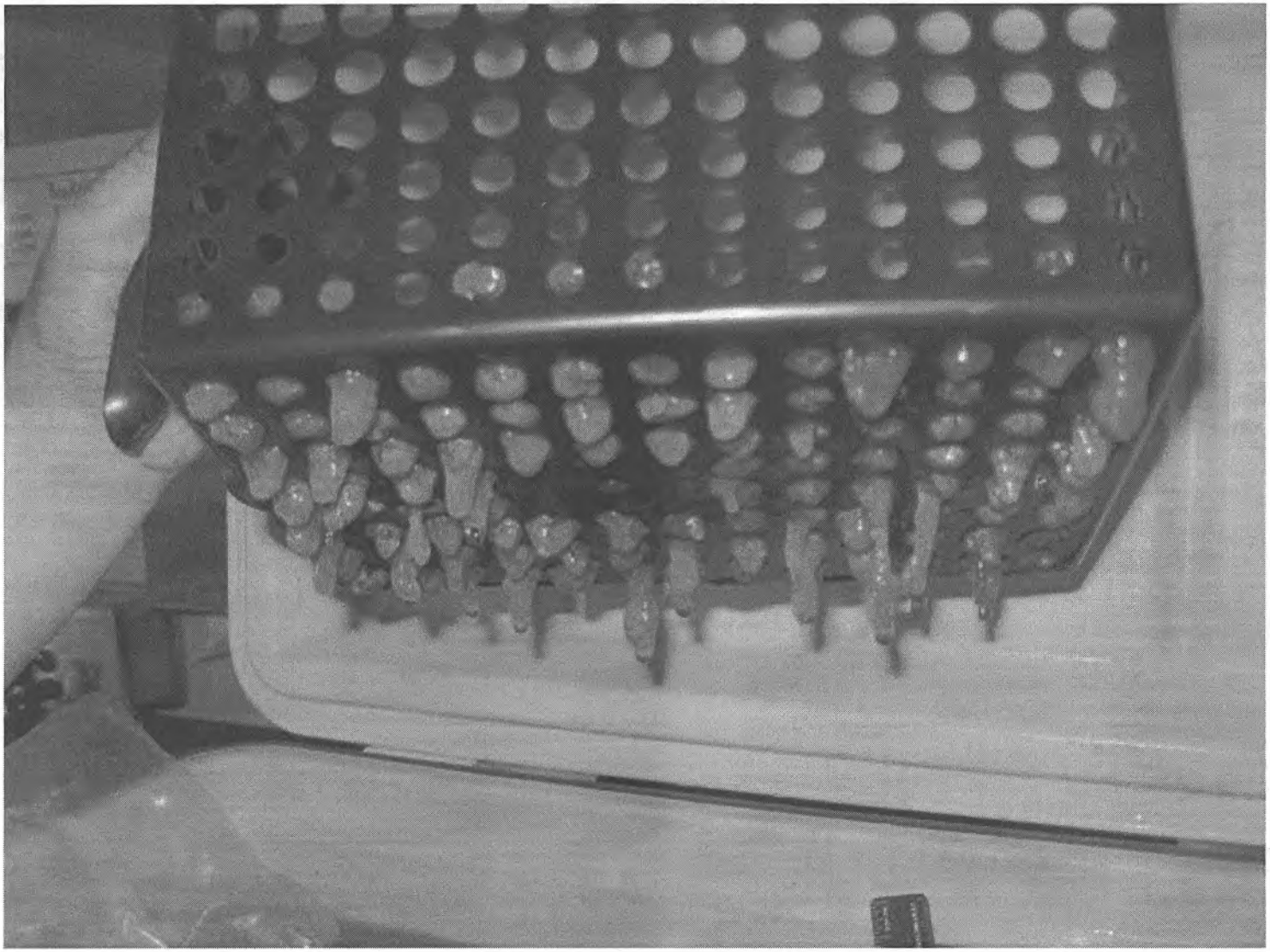
Typical 7-14 day growth of dangles.



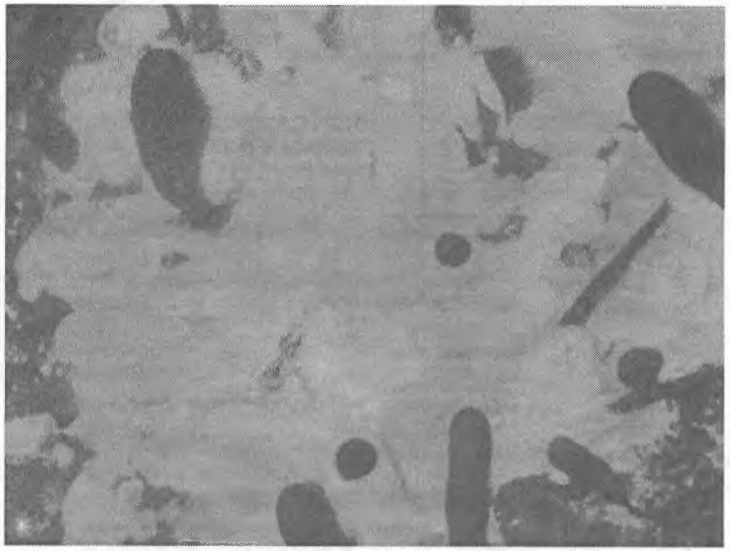
Dangles attenuate and break free

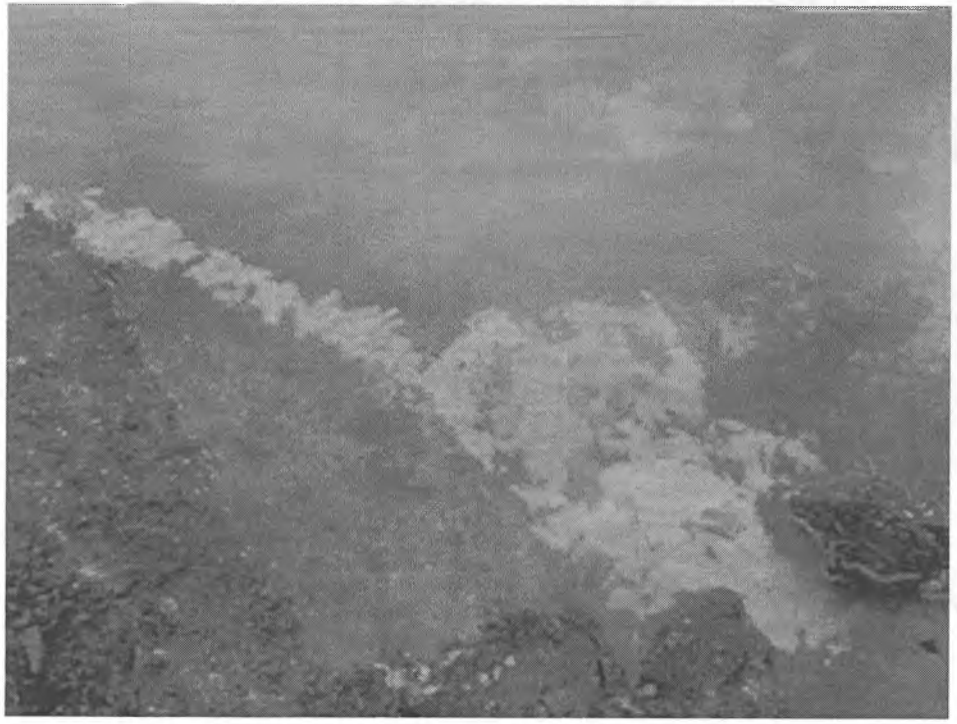


Within a few days ……



Intertidal Dvex
Sitka, Alaska





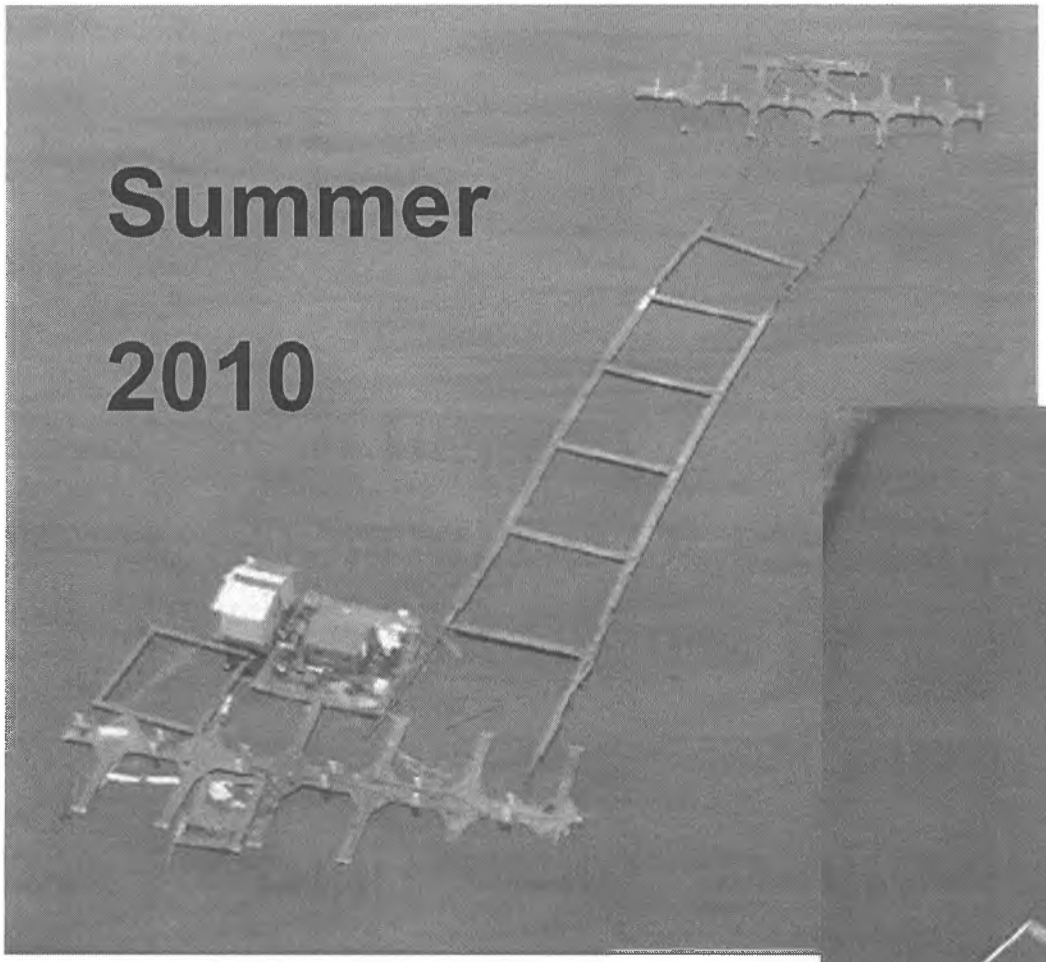
Dvex in Sitka

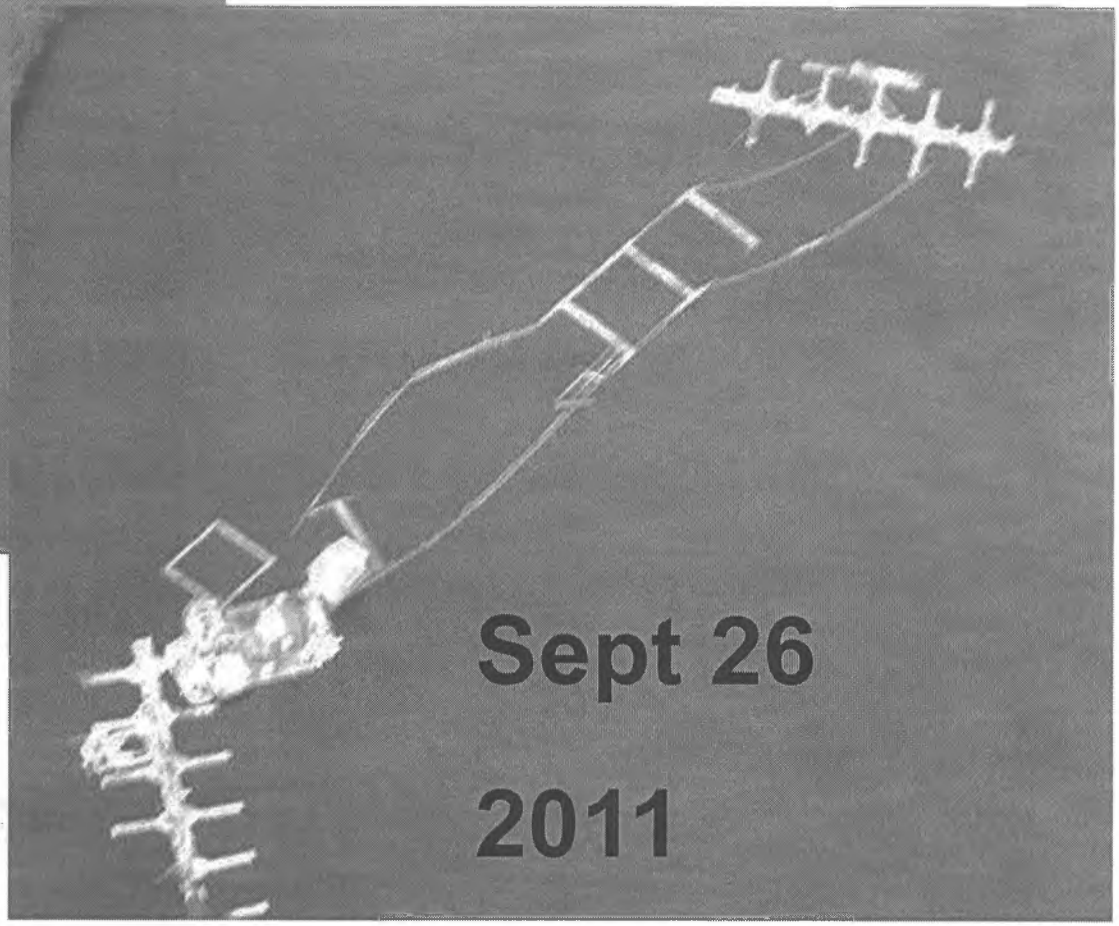
- Explosive growth and potential for spread
- Whiting Harbor infestation
  - First contain, then eradicate.
- Reduce possibilities for reintroduction
- Learn more about the biology of Dvex and potential impacts in Alaska

Whiting Harbor infestation
First contain, then eradicate.

- We all have been saying "Whiting docks are deteriorating and may carry Dvex out of Whiting"
- In fall of 2011, more than a year after Dvex discovery we lost dock structures out of Whiting
- Much has been cleaned up after storms
- There is still a rapidly deteriorating dock structure in Whiting that is heavily infested with Dvex and not well secured.
- Ability to quickly identify and carryout containment is crucial for communities. Still needs to be addressed in Sitka

Whiting Farm Deterioration

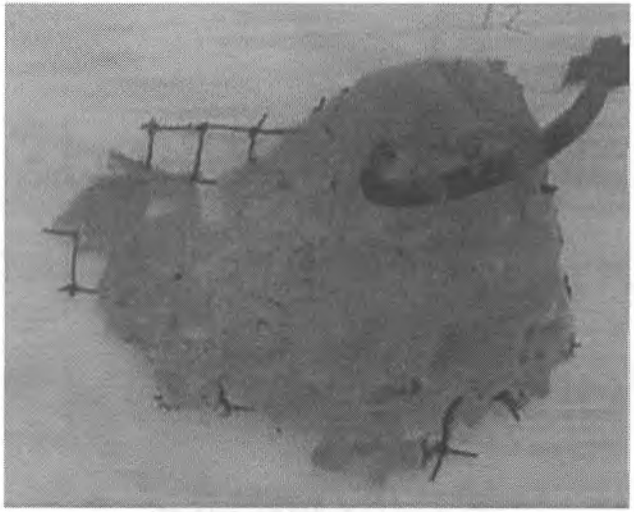




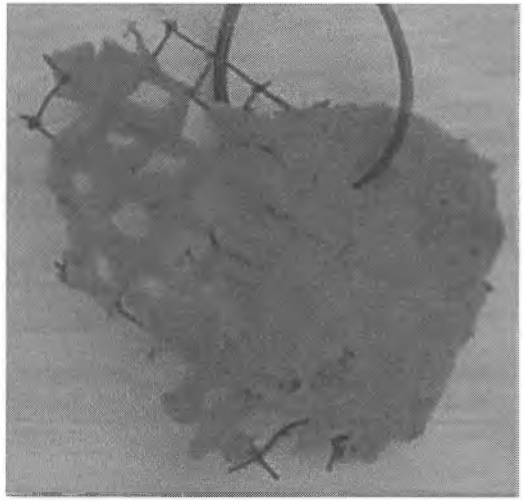
Eradication

- We need to learn how to eradicate
- Smithsonian Environmental Research Center is testing eradication methods.
- This spring the plan is to scale up and try application of salt to limited area of sub-tidal habitat.

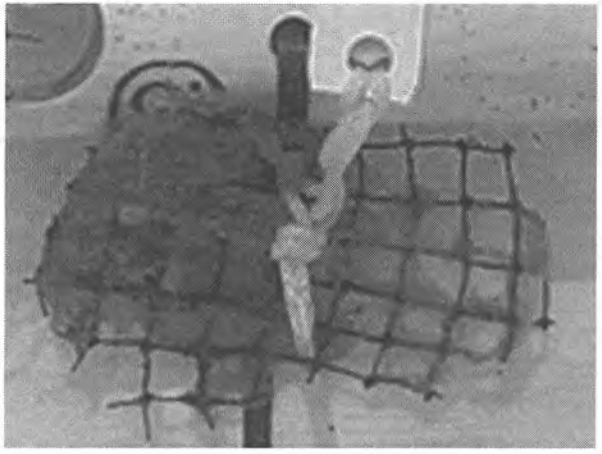
10% Acetic Acid (5 min)



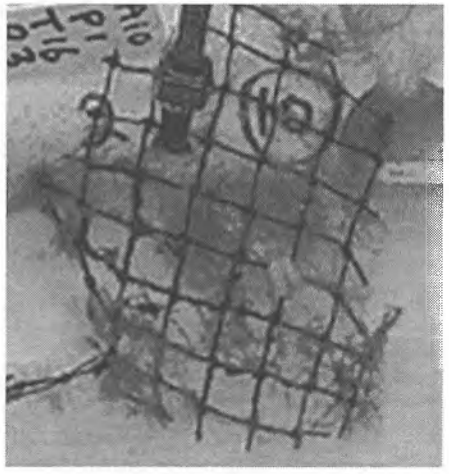
Before



After



1 Week



3 Weeks

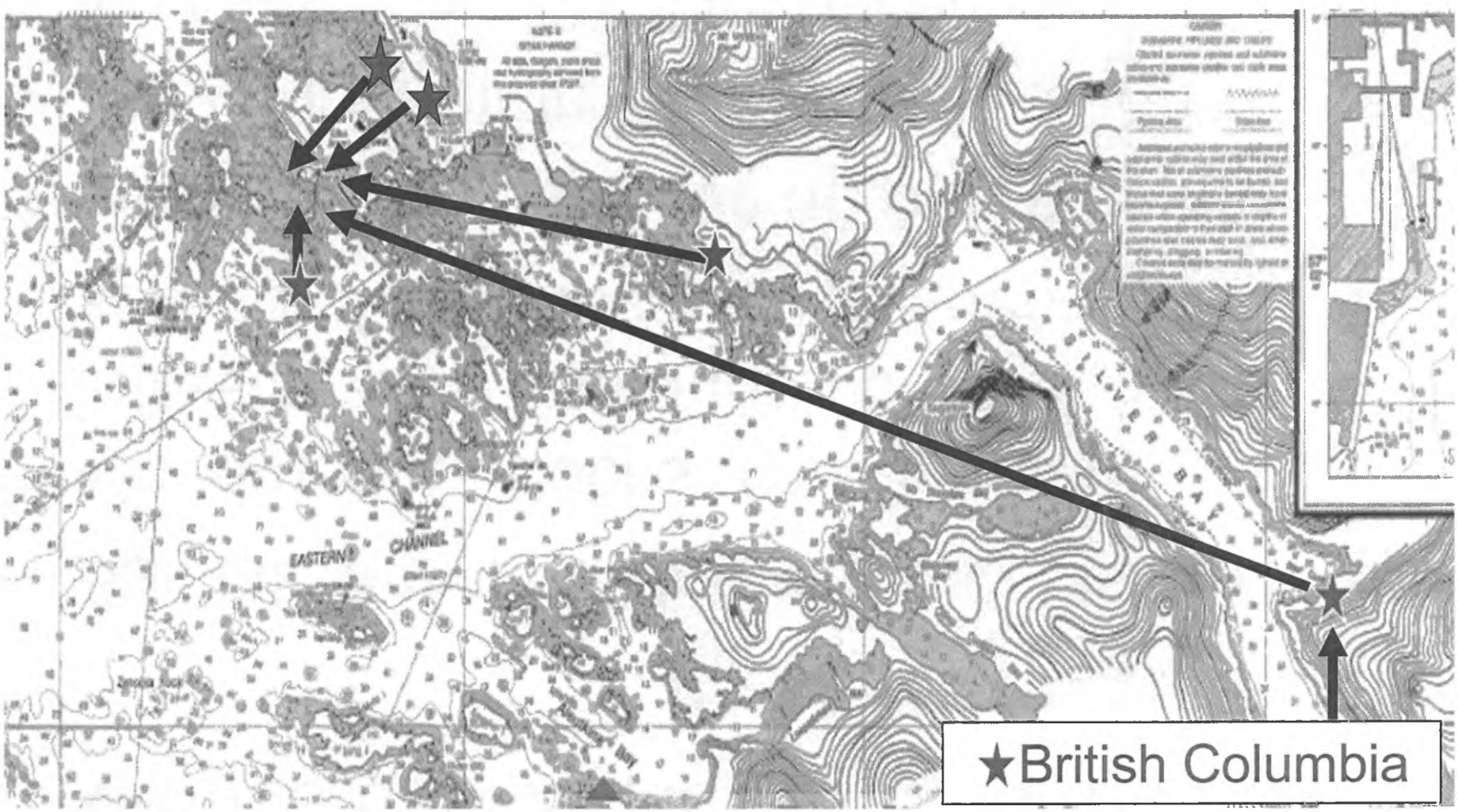
Dvex in Sitka

- Explosive growth and potential for spread
- Whiting Harbor infestation
  - First contain, then eradicate.
- Reduce possibilities for reintroduction
- Learn more about the biology of Dvex and potential impacts in Alaska

Reduce possibilities for reintroduction

- Ballast water, hull fouling, etc. all important
- Movement of docks other floating infrastructure has huge potential for spread of marine invasive species
- Moving a dock moves an entire habitat
- Very common in SE AK
- No legislation (?), little public awareness

Whiting docks pieced together from local and distant sources



Dvex in Sitka

- Explosive growth and potential for spread
- Whiting Harbor infestation
  - First contain, then eradicate.
- Reduce possibilities for reintroduction
- Learn more about the biology of Dvex and potential impacts in Alaska

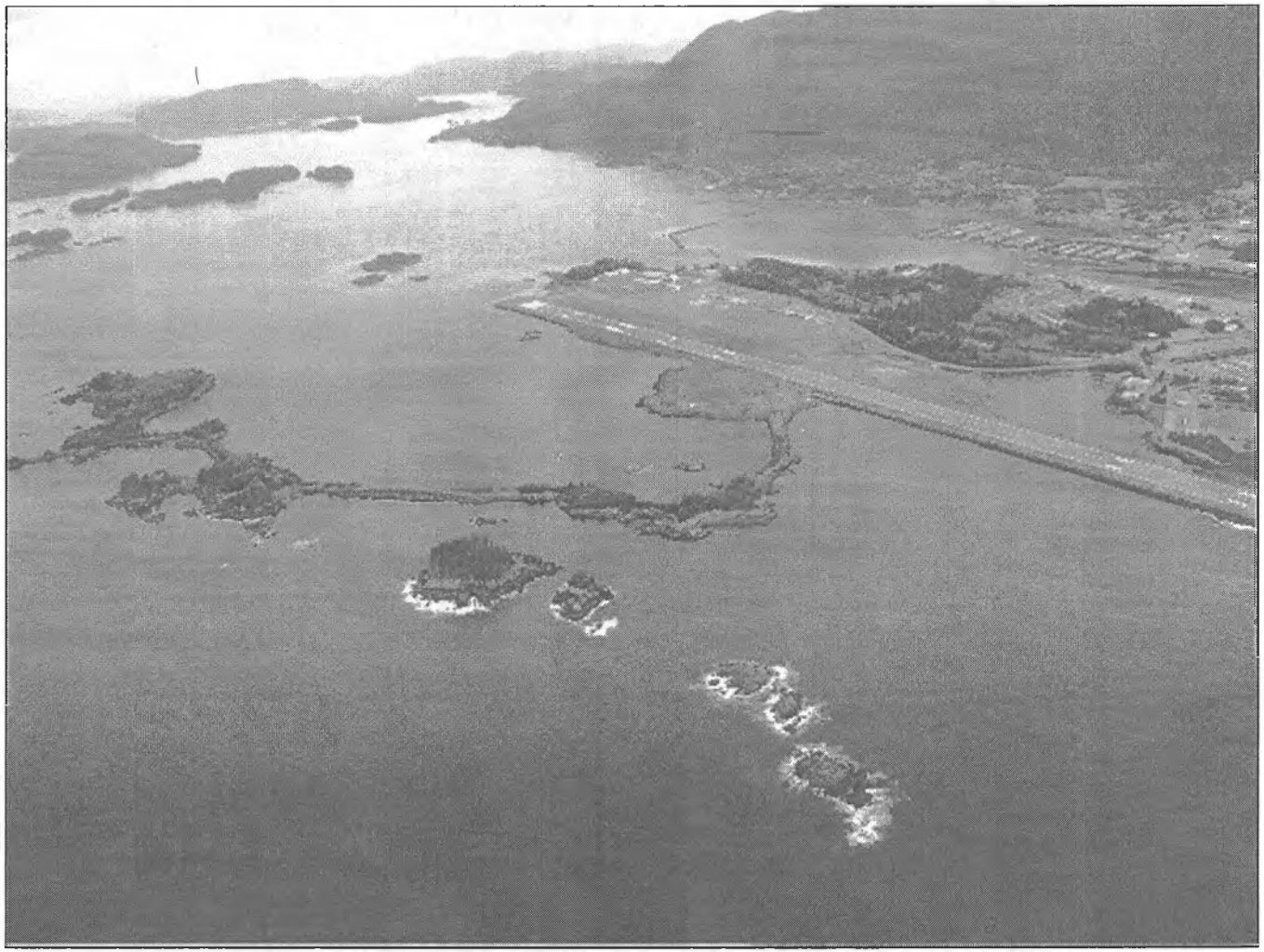
Learn more about the biology of Dvex and potential impacts in Alaska

- Population genetics
- Distribution
- Ecological interactions and impacts
- Sexual reproduction & reproductive cycles
- Asexual reproduction & growth
- Considerations for containment & radication

Impacts for Sitka and Alaska are Unknown

- Example: Herring Eggs (below)
- We know patches of Dvex can reach nearly 100% coverage Whiting.
- We do not know if herring will spawn on Dvex or if herring eggs can survive on Dvex.

Where do we go from here?
Where does Dvex go from here?



Whiting Harbor
Sitka, Alaska

STOP AQUATIC HITCHHIKERS!

www.ProtectYourWaters.net

Follow these simple steps:

☑ Clean

Remove all plants, animals, mud and thoroughly wash everything, especially all crevices and other hidden areas.

☑ Drain

Eliminate all water before leaving the area, including wells, ballast, and engine cooling water.

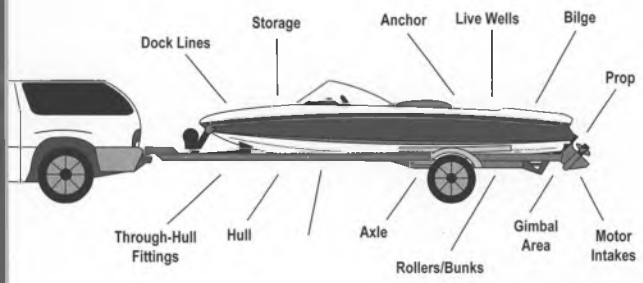
☑ Dry

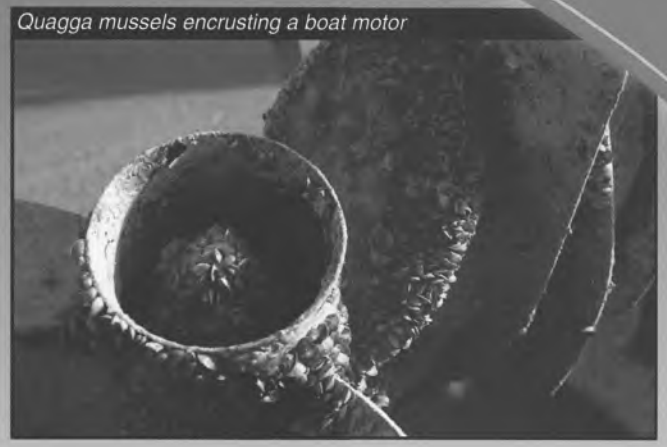
Allow sufficient time for your boat to completely dry before launching in other waters.

If your boat has been in infested waters for an extended period of time, or if you cannot perform the required steps above, you should have your boat *professionally* cleaned with high-pressure scalding hot water (>140 °F) before transporting to any body of water.

Before launching and before leaving...

Inspect everything!





Quagga mussels encrusting a boat motor

Zebra and quagga mussels are a nuisance for anglers and boaters. They can ruin your equipment, clog motor cooling systems, foul hulls, and jam the centerboard wells under sailboats.

100th Meridian Initiative

ZAP THE ZEBRA

www.100thMeridian.org

Please report any sighting by calling our National Hotline:

1-877-STOP-ANS

1-877-786-7267

Report a sighting in Alaska:

1-877-INVASIV

1-877-468-2748

For more information, please visit...

www.100thMeridian.org
www.ProtectYourWaters.net
www.adfg.state.ak.us

100th Meridian Initiative

Quagga Mussels

Zebra Mussels

Image Credits: *Zebra Mussels on a Fishing Lure* by Marc Murrell, Kansas Department of Wildlife and Parks • *Zebra Mussels, Zebra Mussels on a Beer Can, Zebra Mussels on a Native Mussel, Bait Bucket, Quagga Mussels, Zebra/Quagga Mussel Distribution January 2009* by David Britton, U.S. Fish & Wildlife Service • *Zebra Mussels in a Cut-Away Pipe* by Don Schlosser, Great Lakes Science Center • *Zebra Mussels in a Pipe* by Craig Czarnecki, Michigan Sea Grant • *Quagga Mussels Encrusting a Boat Motor* by Matt Watson, The University of Texas at Arlington • The distribution map is based on data compiled by the U.S. Geological Survey's Nonindigenous Aquatic Species Program (http://nas.er.usgs.gov).

Invasive Mussels: Expensive Damage!

When zebra and/or quagga mussels invade our local waters they clog power-plant and public-water intakes and pipes. Routine treatment is necessary and very expensive. This leads to increased utility bills. If you use water and electricity, you do not want these mussels.

Zebra mussels in a cut-away pipe

Zebra mussels blocking a pipe

Zebra/Quagga Mussels May Use Your Boat to Invade Additional Waters!

Once a boat has been in infested waters, it could carry invasive mussels. These mussels can spread to new habitats on boats trailered by commercial haulers or the public. Zebra and quagga mussels attach to boats and aquatic plants carried by boats. These mussels also commonly attach to bait buckets and other aquatic recreational equipment. An adult female zebra mussel can release up to a million eggs in a year. Please take precautions outlined in this brochure to help reduce the chance that zebra or quagga mussels will spread from your boat or equipment to uninfested areas.

Before zebra mussels *After zebra mussels*

USGS science for a changing world

Zebra and Quagga Mussel Sightings Distribution

Dreissena polymorpha and D. rostriformis bugensis

- Zebra mussel occurrences
- Quagga mussel occurrences
- Both species occurrences
- Mussels trailered overland on boat hulls

Map produced by the U.S. Geological Survey, Gainesville, Florida, July 7, 2009.

Zebra/Quagga Mussels Harm Native Aquatic Life

Zebra mussels on a crayfish

Zebra mussels on a native mussel

Zebra/Quagga Mussels Encrust Any Hard Surface

Zebra mussels on a beer can

Zebra mussels on a fishing lure

Zebra Mussels / Quagga Mussels

What are they?

Both are closely related. invasive, freshwater bivalve (mollusk) species that encrust hard surfaces.

Where do they come from?

These species came from the Black and Caspian Sea Drainages in Eurasia.

What size are they?

Larvae are microscopic and adults may be up to two inches long. They are usually found in clusters.

Why "Zebra" mussels?

Both species are sometimes referred to as "zebra" mussels because they both have light and dark alternating stripes. Quagga mussels are actually a distinct (but similar) species named after an extinct animal related to zebras.

What can I do to help?

Protect Your Fisheries

Preventing the spread of invasive pike is the best way to protect fisheries and aquatic wildlife from pike predation.

- Never transport and release northern pike or any other fish into a water body in Alaska.
- If you catch a pike where you have never seen one before, keep the fish and report it to 1-877-INVASIVE.
- If you see anyone other than ADF&G stocking personnel releasing live fish into waters in Alaska, report it to Wildlife Safeguard at 1-800-478-3377.
- Never transport and release fish or other live organisms to waters of Alaska. This is a violation of 5AAC 41.005 and a class A misdemeanor.
- **Fish for pike!** It's fun, and you can help reduce their numbers by harvesting and using all the pike you can catch.

Fishing For Pike

Pike are ambush predators that hide in vegetated areas where they dart out after prey. There are no bag limits for pike in most southcentral waters. Anglers are allowed to spear fish or use up to five lines when ice fishing. Always check the regulations before fishing.

Photo Credit: Corey Schwanke

Photo by Jim Lavakras, Compliments of Anchorage Daily News

For More Information

To view ADF&G's "Management Plan for Invasive Northern Pike in Alaska, see:
http://www.sf.adfg.state.ak.us/region2/pike/
For further questions, contact:

Alaska Department of Fish and Game
Division of Sport Fish
333 Raspberry Road
Anchorage, AK 99518
Phone: 907-267-2889
Fax: 907-267-2401
E-mail: kristine.dunker@alaska.gov

Northern Pike

Outside their native range in Alaska, northern pike can destroy salmon and trout fisheries.

Northern pike are an invasive species in Southcentral Alaska.

Northern pike are native to most of Alaska. Within their native range, they are an extremely valuable subsistence and sport fish. However, where northern pike do not naturally occur such as in Southcentral or Southeast, they are an invasive species capable of causing tremendous amounts of ecological and economic damage.

Northern Pike

Invasive species are plants and animals that do not naturally occur in an area and can negatively affect the environment, the economy and/or recreational activities.

How did pike get to Southcentral Alaska?

Beginning in the 1950's pike were illegally introduced to lakes in the Susitna watershed. From there, they spread to many other water bodies. Further illegal introductions of pike to lakes in Anchorage and the Kenai Peninsula perpetuated the problem. Today, northern pike have been confirmed in over 130 water bodies in Southcentral.

Pike were illegally introduced into lakes in Southcentral.

Outside their native range in Alaska, northern pike:

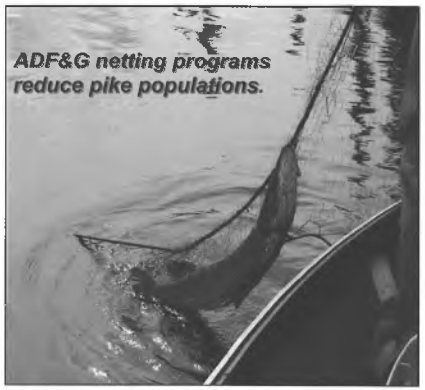
- Reduce populations of fish, waterfowl, wood frogs, and small mammals.
- Threaten wild and stocked fisheries.
- Threaten local economies that depend on revenue from anglers and wildlife viewers.

Within their native range, pike are a valuable subsistence and sport fish.

In Southcentral Alaska, invasive northern pike are voracious predators on rearing salmon and trout.

What can be done?

Division of Sport Fish biologists have been using gill nets to remove invasive pike from lakes. Though pike populations have been reduced, this method will never eliminate all of the pike. In the future, more intensive methods will be necessary to completely eradicate populations of invasive pike so that impacted fisheries can be restored.



ADF&G netting programs reduce pike populations.

What can I do to stop the spread of aquatic invaders?

Be observant. Report any animal or plant you think is unusual and may be a pest, PLEASE DO NOT TAKE A SAMPLE! Instead, note its location (take GPS points if you can), take a photo, and immediately phone the Alaska Department of Fish and Game Invasive Species hotline at **1-877-INVASIV** or email tammy.davis@alaska.gov.

Avoid infested waters–avoid Whiting Harbor. If you have visited an area known to be infested with an aquatic pest, inspect anchors, ropes and chains before leaving the area and dispose of any unusual plants or animals in a sealed container in a trash can. Let lines and anchors dry completely or rinse thoroughly with fresh water.

Keep your vessel hull free of fouling. Don't let pests hitchhike to a new location. Maintain antifouling treatments to your vessel hull, if appropriate. Do not conduct any hull-scraping in the water. Use a dry dock or other facility where the fouling material can be collected and disposed of in an upland area or landfill.

Don't move contaminated gear. Pieces of dock, barges, and other materials that are stored in the water can easily be contaminated with invasive species. Do not move pieces of dock without first having dried them out completely or decontaminated them.

Decontaminate your gear. Use plenty of fresh water, away from saltwater or let it dry out completely.

Remove colonial tunicates manually from your gear. Dispose of tunicates in a garbage receptacle or let dry completely. If pressure washing of aquatic farm gear cannot be avoided, only do so on land and make sure the outflow does not go into the sea.

Educate a friend about invasive species. Learn about your local marine habitats and the organisms they support. Learn about invasive species that threaten your local areas and share information with others.

ADF&G administers all programs and activities in compliance with state and federal civil rights and equal opportunity laws. Obtain the full ADF&G and Americans with Disabilities Act and Office of Equal Opportunity statement online at www.adfg.state.ak.us or from the ADF&G Public Communications Section at 907-465-6166. April 2011

UAS UNIVERSITY OF ALASKA SOUTHEAST
learn · engage · change

Smithsonian Environmental Research Center

ALASKA DEPARTMENT OF FISH AND GAME

NOAA

U.S. FISH & WILDLIFE SERVICE

ROMBERG TIBURON CENTER FOR ENVIRONMENTAL STUDIES

SITKA SOUND SCIENCE CENTER

Invasive Species ALERT: COLONIAL SEA SQUIRT

Photo ©ADF&G.

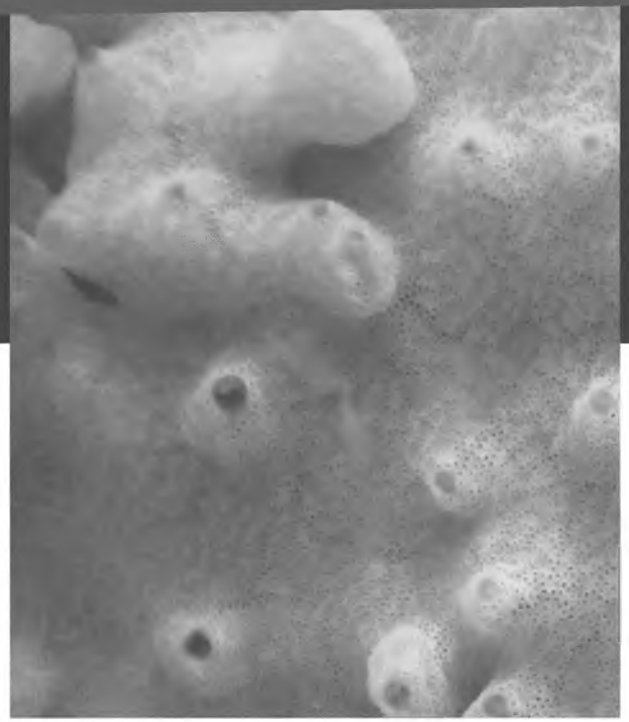


Photo ©ADF&G.

Colonial sea squirts invade Alaska

Commonly known as sea squirts, colonial tunicates are effective invaders of the marine environment and can have serious impacts on natural habitats, biodiversity, and economic activities. The colonial sea squirt, *Didemnum vexillum*, also called marine vomit, was found in Sitka waters. This nonnative tunicate grows on natural substrates such as rocks and gravel seabeds, as well as seaweed, mussels and oysters. It also colonizes man-made structures like docks, boat hulls, lines and nets. The aggressive growth of this invasive tunicate may alter fisheries resources and the habitats that sustain them.

- *D. vex* is expanding across the offshore fishing grounds of Georges Bank off the New England coast.
- When tunicates foul aquatic farm gear, defouling activities result in increased handling and increased product costs.
- Populations of *D. vex* on the Pacific coast of the U.S. may be sources for further expansion to Alaska.

An invasive colonial sea squirt, *Didemnum vexillum*, was found in Sitka's Whiting Harbor in June 2010. It grows over a variety of surfaces, such as docks, boat ramps, boat hulls, rocks and gravel seabeds, as well as pliable substrates such nets, rope, kelp, and other native organisms. It can encrust nonmobile marine animals such as mussels and oysters.

Tunicate profile

Description: *D. vex* may be orange, pink, yellow, tan or cream. Its surface has visible veins with small pores. The texture of the sea squirt is smooth, like firm gelatin, and is somewhat leathery rather than slimy. Mature colonies can form large, pendulous lobes that resemble tendrils of dripping wax or may form extensive undulating mats with short lobes when growing on the ocean floor.

This invasive tunicate is tricky to identify, and may easily be confused with colonial sea squirts or sponge animals that naturally occur in Alaska.

Habitat: Primarily found along inshore coastal areas, *D. vex* typically grows on submerged hard surfaces including docks, pilings, and rocky ocean bottoms. In Sitka it has been found growing in the intertidal zone. It can tolerate a wide range of water temperatures and environmental conditions.

Reproduction and dispersal: *D. vex* is a particularly strong invader in part because it is capable of reproducing sexually and asexually. When fragments detach from a parent colony they are viable and can reproduce as long as suitable habitat is available. This characteristic is especially concerning because cleaning infested boat hulls or aquatic farm gear into or near the marine environment can easily result in spreading this invasive sea squirt.

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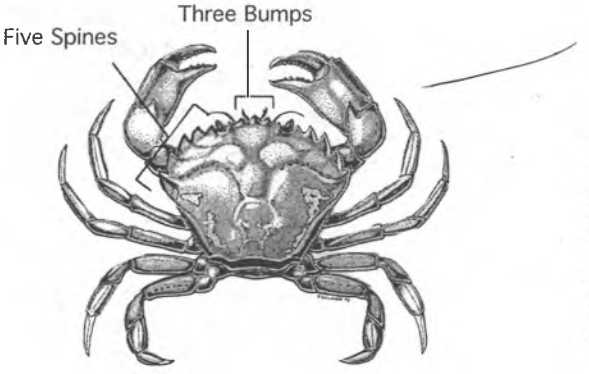
STOP AQUATIC INVASIVE SPECIES

EUROPEAN GREEN CRABS

WHY LOOK FOR EUROPEAN GREEN CRABS?

European green crabs compete with native crab species and are voracious predators of clams, oysters, mussels, marine worms, and small crustaceans. In Alaska, green crabs could pose a serious economic and environmental threat to native crabs, including the young of commercially caught crabs, as well as to clam and oyster fisheries.

DISTINGUISHING FEATURES:



Art by Timothy Sullivan

- Five distinct spines (teeth) on each side of shell, between widest part of shell and eyes
- Top shell (carapace) usually dark brown to green, mottled with yellowish spotting
- Top shell up to 4 inches wide
- Three bumps between the eyes
- Both front claws the same size

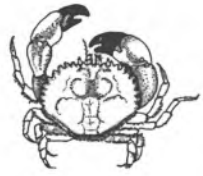
Common Alaska Crabs that can be confused with European green crab

Helmet or Horse Crab

- Large, jagged teeth on each side of top shell
- Entire body covered with stiff, bristly hairs
- Frontal area protrudes past eyes

Pygmy Rock Crab

- Large claws, tips black
- Top shell nearly circular in outline, widest at 7th or 8th tooth
- Legs very hairy



Dungeness Crab

- Broadly oval, uneven top shell with ten teeth, widest at the 10th and final tooth
- Narrow frontal area, with five unequal teeth between the eyes
- Light-colored leg tips

Reporting:

You can play an important role in the early detection of non-native species. Community monitors have been widely successful against the spread of the European green crab in North America. Green crabs have successfully invaded the West coast of North America as far north as British Columbia, but have not been found in Alaska. Scientists and resource managers generally agree that green crab arrival in Alaska is no longer a matter of "if" but "when."

• When looking at a suspicious crab, compare the appearance with the description on this card. If you think you have a green crab, do not release it! Take a picture of the crab, if you can.

• Put the crab in a container, labeled with the date and location where it was found. Describe the environment you found it in, such as rocky beach or boat hull.

• Freeze it and call 1-877-INVASIV. Email your pictures to tammy.davis@alaska.gov. Researchers will need the crab to confirm its identification.

If you are interested in learning more about citizen-based invasive species monitoring, call **907-226-4663** or **1-877-INVASIV.** Learn more about the European Green Crab and other invasive species at **www.alaskainvasives.org**

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Alaska Islands & Ocean Visitor Center
95 Sterling Highway, Suite 2, Homer, AK 99603
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THE FOLLOWING PUBLICATION HAS NOT BEEN FILMED BUT IS AVAILABLE IN THE ORIGINAL FILE AND ONLINE:

INTRODUCTION TO COMMON NATIVE & POTENTIAL INVASIVE FRESHWATER PLANTS IN ALASKA

http://alaska.fws.gov/fisheries/invasive/pdf/AK Aquatic Plants full.pdf

Introduction to Common Native & Potential Invasive Freshwater Plants in Alaska

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This document is based on *An Aquatic Plant Identification Manual for Washington's Freshwater Plants*, which was modified with permission from the Washington State Department of Ecology,
by the
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US Fish & Wildlife Service - Coastal Program
US Fish & Wildlife Service - Aquatic Invasive Species Program

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