Kenai Peninsula Invasive Northern Pike: Research and Control Efforts

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The Kenai Peninsula supports valuable sport, commercial and personal use salmon fisheries.

Commercial fleet and dip-netters going fishing.
40-inch wild Kenai R. rainbow trout
Current status of invasive pike waters in South-central Alaska
Pike were first illegally introduced to a lake in the Kenai River drainage in the mid-1970’s. Nearly 4 decades and 19 invaded lakes and streams later, ADFG got into the pike control game.
Saltwater and glacial systems have probably slowed pike dispersal throughout the Kenai Peninsula.
Status of Kenai Peninsula Pike Waters

High Risk Areas
## Pike effects to native fish in shallow lakes

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<th>Rainbow Trout</th>
<th>Coho Salmon</th>
<th>Dolly Varden</th>
<th>Stickleback</th>
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Pike from Soldotna Creek could spread to other critical fish habitat.
Standard pike control actions ADFG has used

Netting and trapping

Barriers

Public education

Liberalized harvest
Over time, eradicating pike from the Kenai Peninsula appeared realistic.
A control strategy that evolved into a successful eradication tool (under certain situations) is under-the-ice netting.
Under-the-ice netting

Pros:

Low maintenance – nets can fish for months unattended

Allows fishing during pike spawning (late April early May in AK)

No bird catches

Less conflict with recreationists/float planes, etc.

Pike eradication was successful in 3 small lakes (<40 acres each) with low pike abundance. Net density was high (60 to 240 lineal ft. of net/acre)
Other eradication options

Dewatering

Chemical treatment

Stormy Lake drain plans

Applying rotenone to Scout Lake, 2009
Rotenone is a great tool for us because…

1) Kenai Peninsula pike distribution is relatively limited and eradication appears realistic

2) Treatment logistics are aided by road system access of pike lakes

3) Comparative long term cost is low

Challenges….

Treating large open systems

Native fish impacts

Perceived health concerns
Rotenone persistence in cold water = 4 to 8 months
Stormy Lake Restoration
Stormy Lake Rotenone Techniques

Backpack applicator

Treating deep water – custom apparatus

Neutralizing rotenone with KMNO₄

Drip stations treated the outlet creek
Saving Stormy Lake’s Native Fish
Temporary Relocation of Native Fish

Reviving rotenone-impaired fish

Overwintering native fish in net pens

Returning native fish back to Stormy Lake
Treatment Success Evaluation

Fates of 13 released radio-tagged pike

Fates of caged sentinel fish (juv. coho)

Determination of rotenone concentration and persistence

Gillnet survey
The Next Challenge

Make the Soldotna Creek Drainage pike-free by 2017
2014 – Phase One
2016 - Phase Two
Multi-Staged Approach

Dozens of gillnets fished throughout fall and winter

Temporary fish barriers will be installed at all lake outlets

Breaching beaver dams to reduce water volume
Phase One will create a pike-free zone and a place to relocate rescued native fish collected from the remainder of the drainage.

Juvenile coho salmon
Kenai Area Pike Research

1. Movement study
2. Distribution surveys
3. Hydro gun effects
4. Light traps
5. eDNA
Detection of illegally introduced pike and salmon in a landlocked lake in the Soldotna Creek drainage, 2002
USGS and ADFG Commercial Fish Division test seismic hydrogun effects on pike at Derks Lake (Soldotna Creek drainage).
Light Trapping Pike in the Land of the Midnight Sun

Quatrefoil light trap: takes advantage of larval pike phototaxis

Larval pike 17mm in length
Environmental DNA (eDNA)

A gillnet in a bottle?
Stocked Aquaria and Lake Trials

Filtering water samples for eDNA

*Lab results are pending
Drum with decomposing pike used for post-mortem eDNA persistence trials

Only milting males were used to seed study lakes

Floatplanes provided access to remote drainages to sample for pike eDNA
Species-specificity of CytB qPCR assay for N. pike

*Non-target species include:
- rainbow trout
- coho salmon
- sockeye salmon
- chinook salmon
- Arctic char
- dolly varden
- Arctic grayling
- round whitefish
- blackfish
- Arctic lamprey
- eulachon
- longnose sucker
- slimy sculpin
- three-spined stickleback
- nine-spined stickleback
- muskellunge.

Slide is courtesy John Wenburg, Jeff Olsen and Cara Lewis of the USFWS Conservation Genetics Lab, AK
COI qPCR assay for N. pike amplifies eDNA from aquarium

*eDNA from 5-50ml water samples from a 20 gallon aquarium with one pike

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Acknowledgements

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Kenai Peninsula Fish Habitat Partnership
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