

Northern Pike Control in Southcentral Alaska



Photo by Jim Lavakras, Compliments of ADN



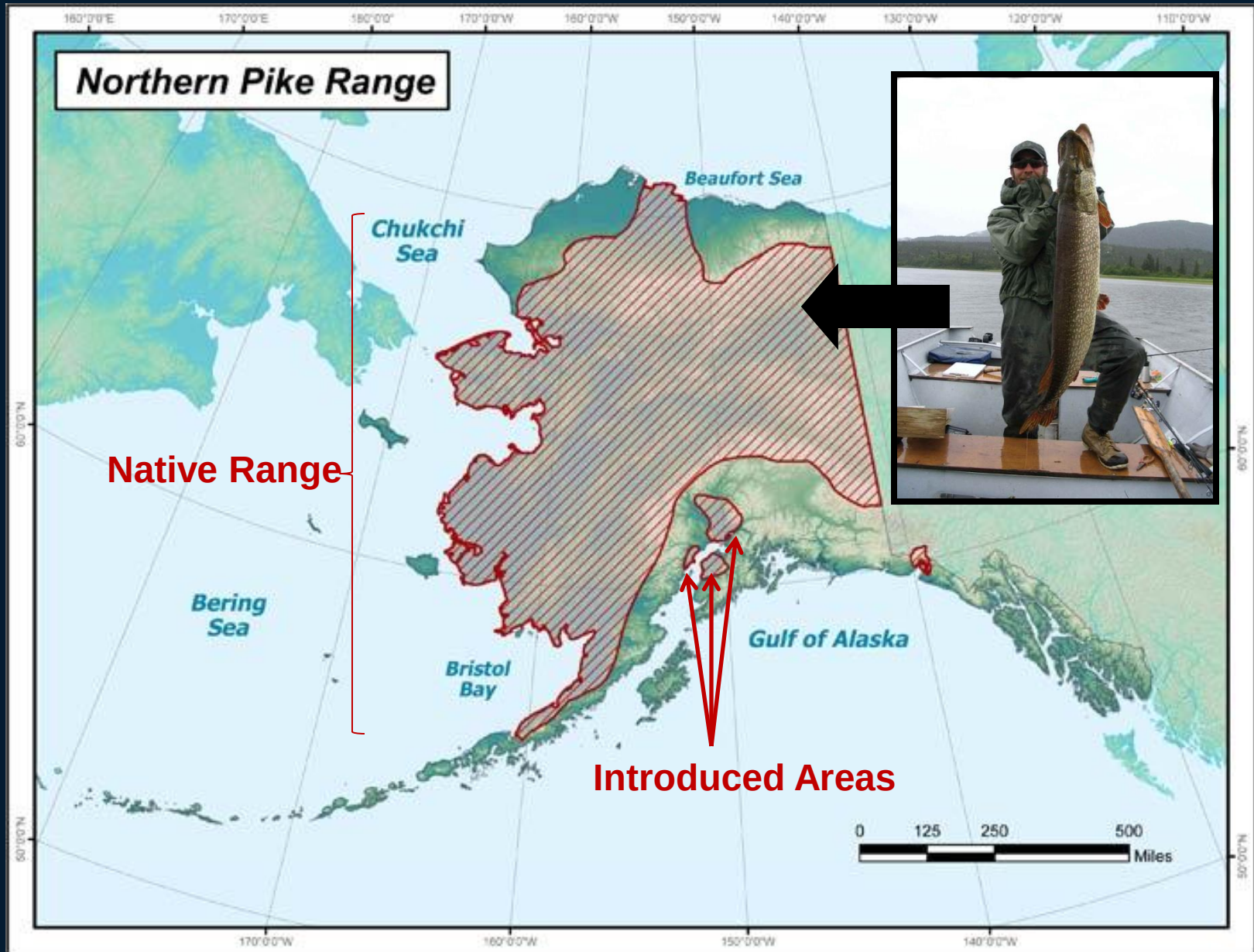
Kristine J. Dunker
Northern Pike Control Committee
Alaska Department of Fish and Game
Division of Sport Fish

Northern Pike

Esox lucius



Range of Northern Pike in Alaska



Pleistocene Glaciers in Alaska

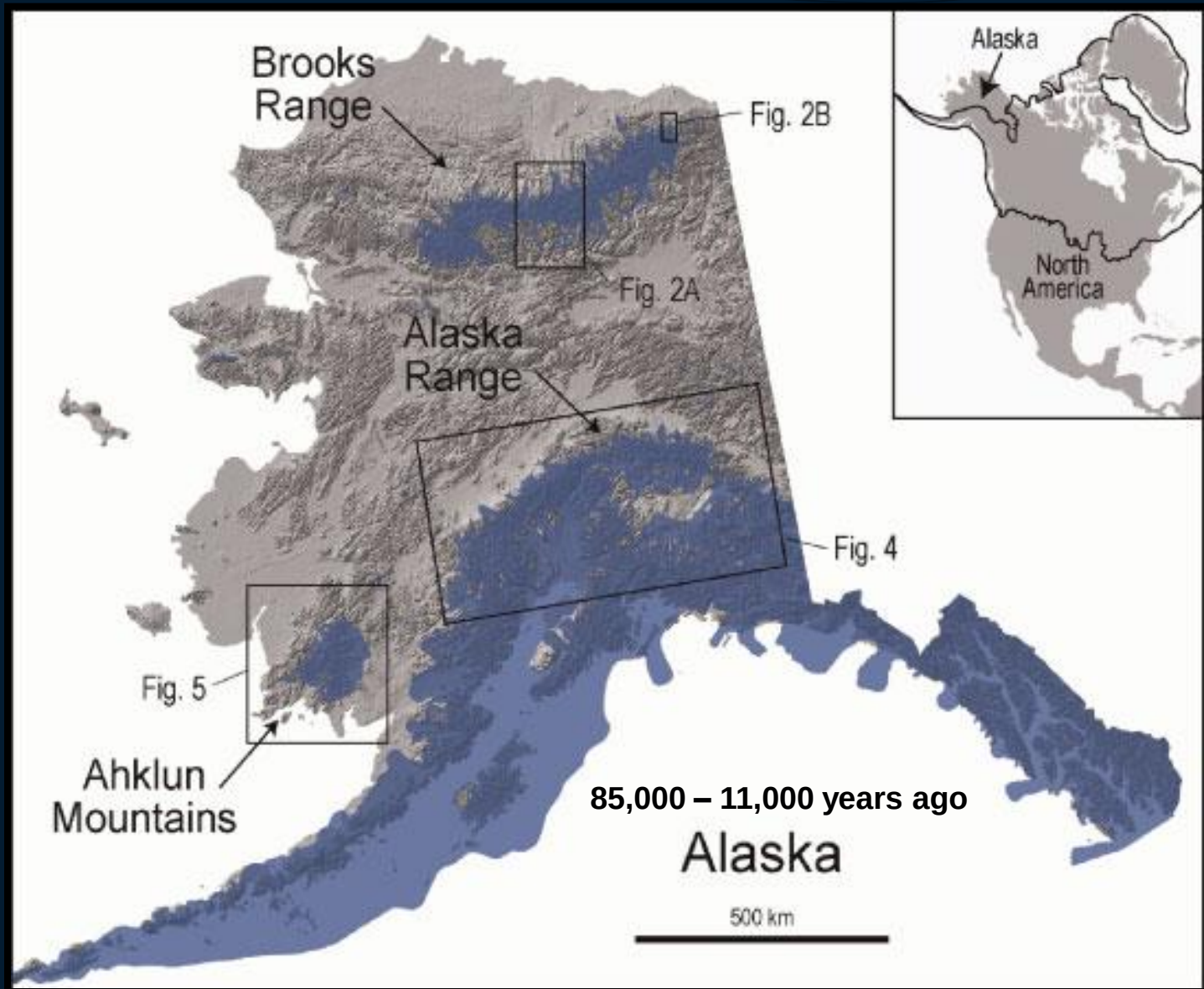


Image Credit: Kaufman and Manley, 2004

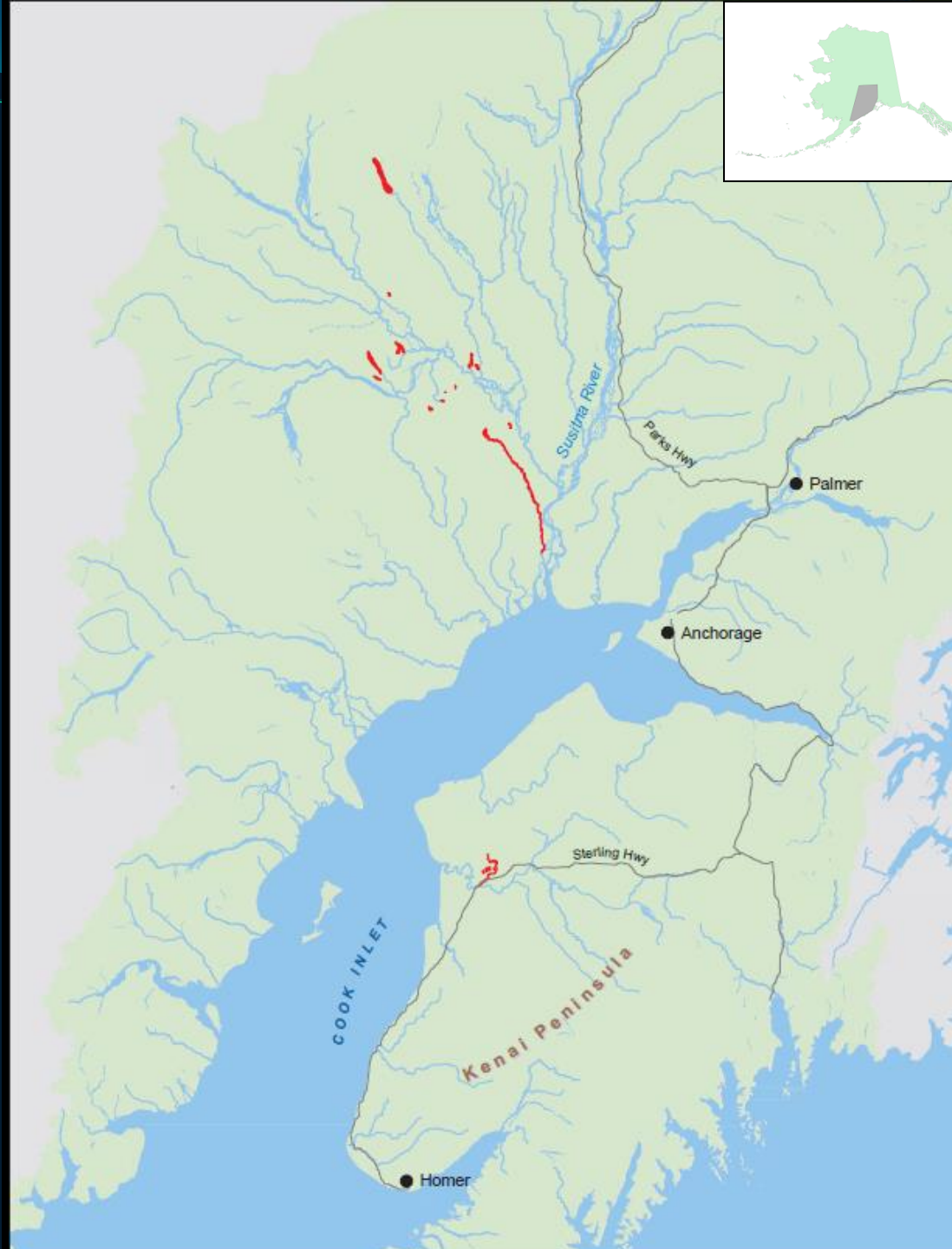
Northern Pike Dispersal in Southcentral Alaska

1950s – 1960s



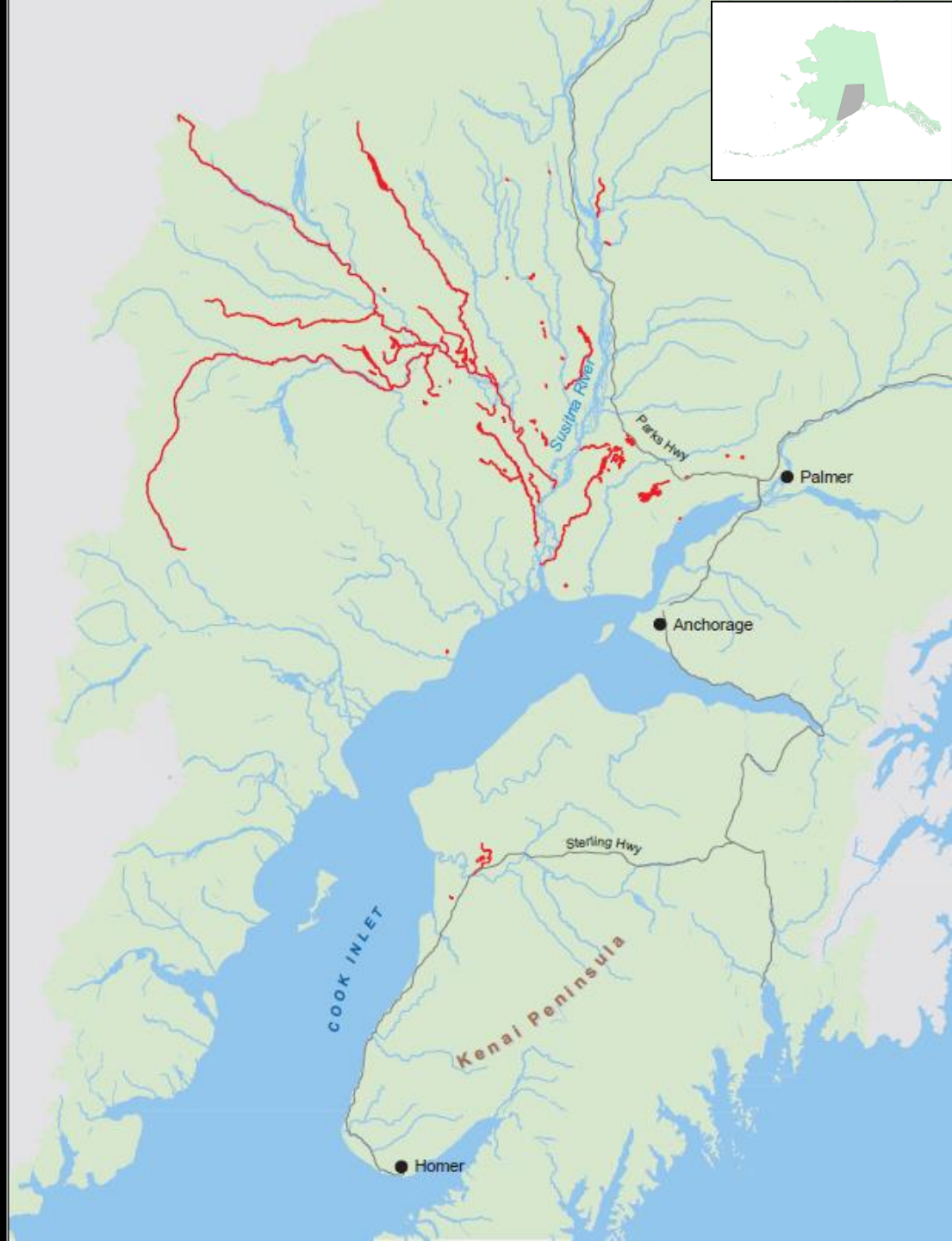
Northern Pike Dispersal in Southcentral Alaska

1970s



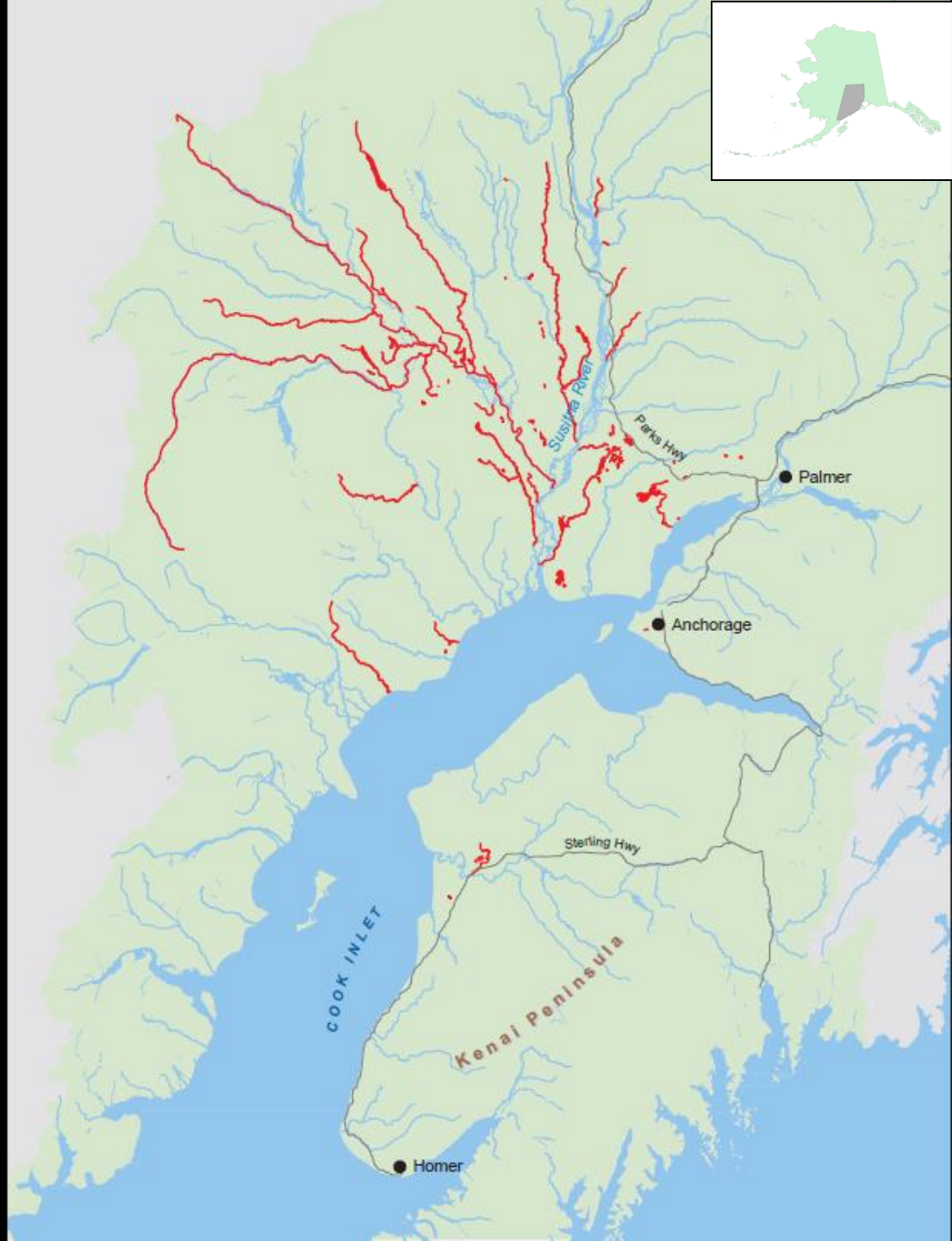
Northern Pike Dispersal in Southcentral Alaska

1980s



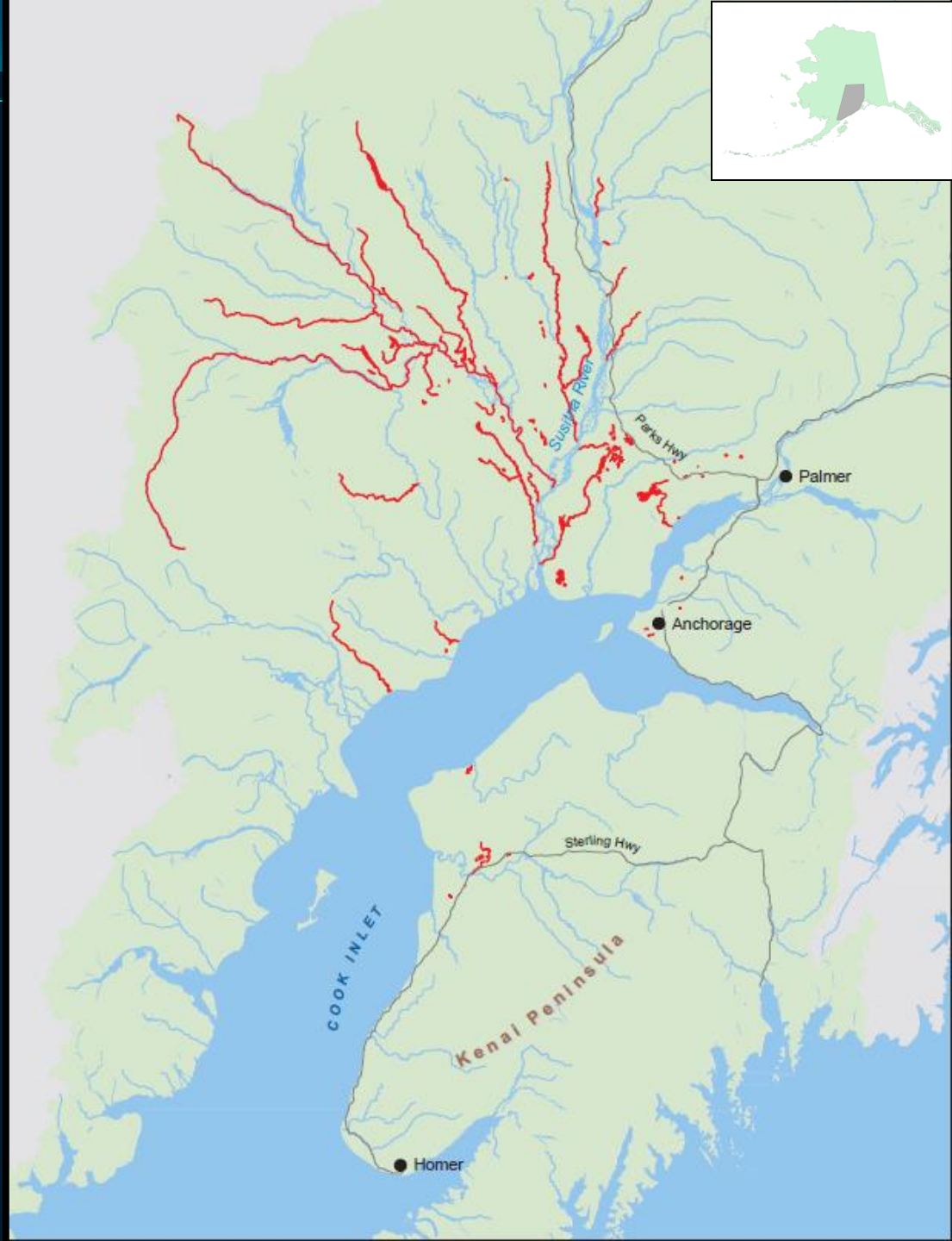
Northern Pike Dispersal in Southcentral Alaska

1990s



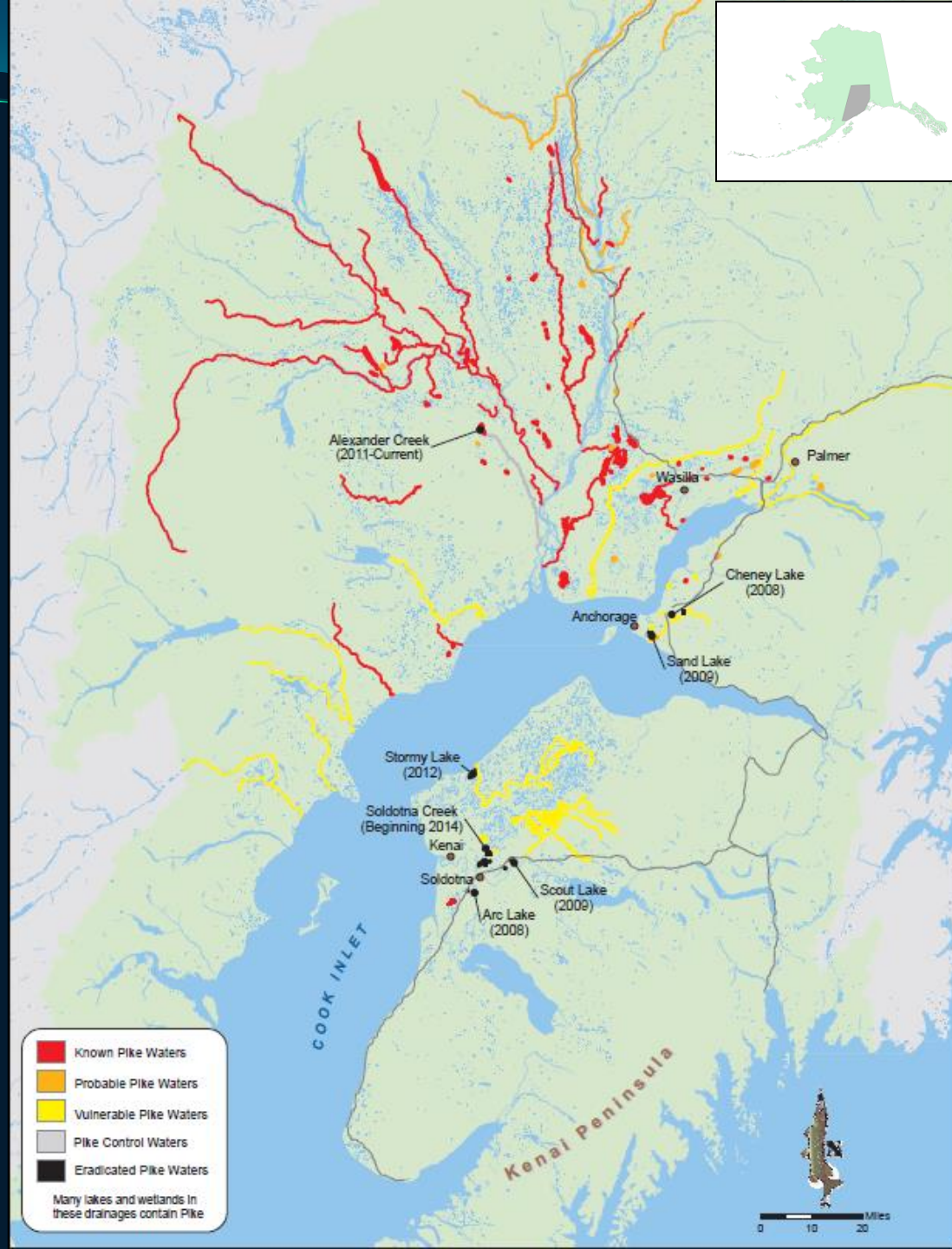
Northern Pike Dispersal in Southcentral Alaska

2000s



Current Northern Pike Distribution in Southcentral Alaska

> 120 water bodies with
invasive pike



Northern Pike Habitat



Alexander Lake

Ecological Concerns



- Apex predators
- Sit-and-Wait Ambush predation



- Opportunistic Feeders
 - Primarily piscivorous
- Habitat overlap with rearing salmonids
 - Fishery declines

Economic Concerns

Pike predation →

- Reduce productivity of wild stocks
- Discontinue hatchery stockings
- Threatens an industry valued at ~ \$1 Billion



Commercial



Recreational



Subsistence



ADF&G Has Aggressively Worked to Control Invasive Northern Pike

- Educating the public
- Identifying distribution
- Liberalizing harvest
- Implementing control and eradication actions



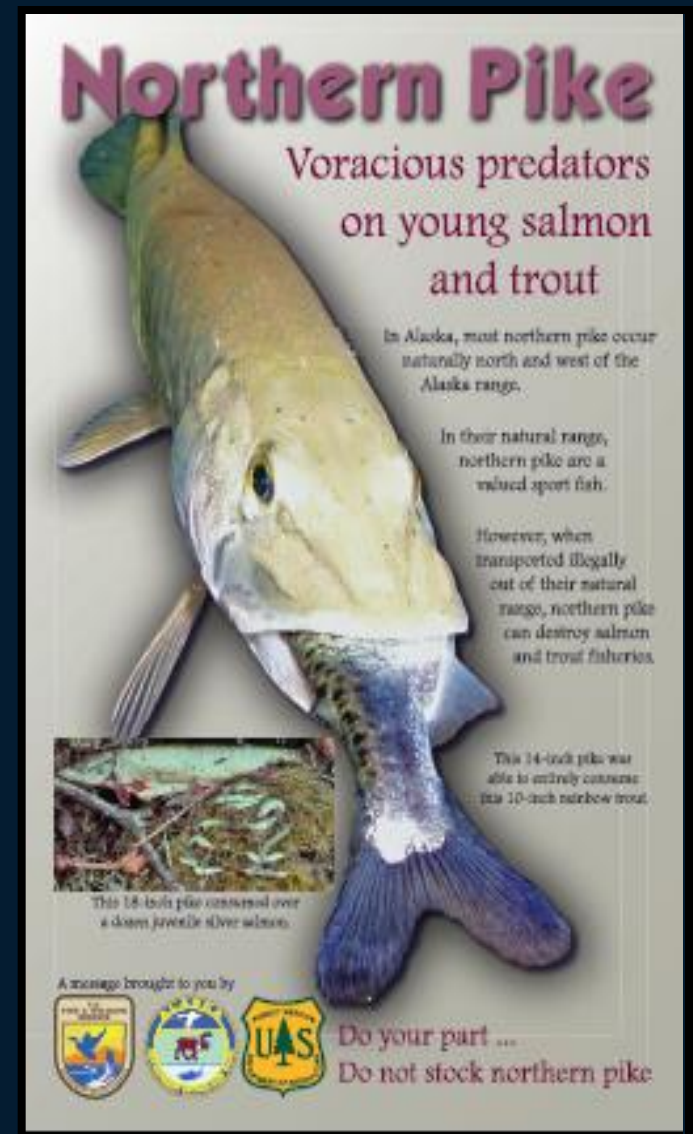
Outreach

Public Outreach

- Education
- Brochures
- Web sites
- PSAs
- Fishing DVD

Message: Northern pike are invasive in Soutchentral.

Illegal stocking has negative consequences.



Legal Ramifications

Penalty

- Class A misdemeanor
- Restitution for damages

AS 16.35.210 (c)



Increase Sport Harvest

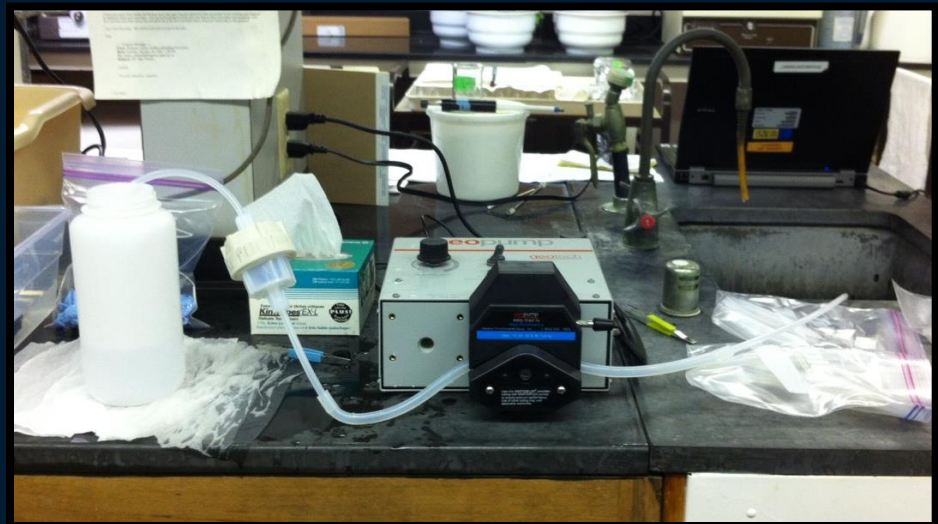
Sport Fish Regulations

- No possession limit
- Multiple harvest methods
 - Spear, bow, 5 lines (ice)
- Illegal to release pike alive in NCI waters



Research

- Distribution
- Habitat utilization
- Diet analysis
- Movement patterns
- Control methods
- Detection methods
 - eDNA



Northern Pike Control

Gill Netting

Purposes:

- Detect presence
- Monitor populations
- Targeted control



Northern Pike Eradication

Rotenone



Rotenone treatment of Union Lake, Kenai Peninsula, 2014

Invasive Northern Pike Management Plan

ADF&G Mission: Protect the fish and game resources of the state, and manage their use in the best interest of Alaskans

Plan Objectives:

- Increase public awareness
- Prevent future introductions
- Public processes to gain support
- Pike control / eradication
- Improve fish populations
- Restore fisheries

The current plan is under revision and will be out for review in 2015.

Strategic Planning

Developed Scoring Matrix in 2010

- Criteria based on:
 - Threats to fisheries
 - Habitat significance
 - Watershed characterization
 - Cultural significance
 - Economic impacts
 - Feasibility

Pike committee meets every two years to update the priority list

Strategic Planning (2010-2014)

ADF&G Sport Fish Division Priority Projects:

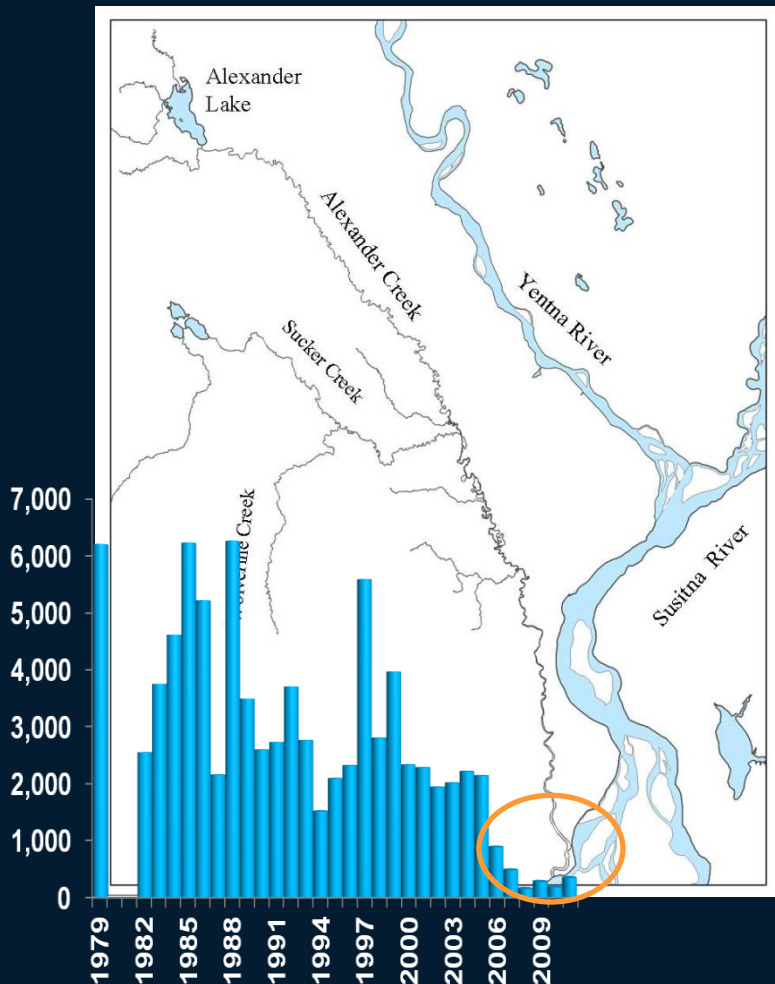
1. Alexander Creek Pike Control
2. Cottonwood Creek Drainage Pike Suppression
3. Soldotna Creek Northern Pike Eradication – Phase 1
4. Soldotna Creek Northern Pike Eradication – Phase 2
5. Stormy Lake Northern Pike Eradication
6. Otter Lake Northern Pike Eradication
7. Cabin and Nancy Lake Pike Suppression
8. Kenai eDNA Research
9. Lower Fire Lake Pike Eradication
10. Alexander Creek Northern Pike Movement Study
11. Knik, Prator, Memory, North Rolly, and Taniana Lakes Pike Eradication
12. Susitna Pike Movement and Diet Study
13. Tote Road Lake Pike Eradication
14. Anchorage Lake Pike Assessment

Estimated Total Program Cost: \$5,325,000

Funds Received To Date: \$3,295,000

Alexander Creek Pike Control

Top northern pike priority



Alexander Creek Chinook Escapement

- Susitna River tributary
 - Very productive King fishery prior to 2000
- Pike in the lake for decades
 - Discovered in lower river in late 1990s
 - 9 lodges and float plane charters operated there
- King numbers crashed
 - Other systems were thriving
- All fisheries now closed
 - All lodges and businesses closed

Alexander Creek Pike Control

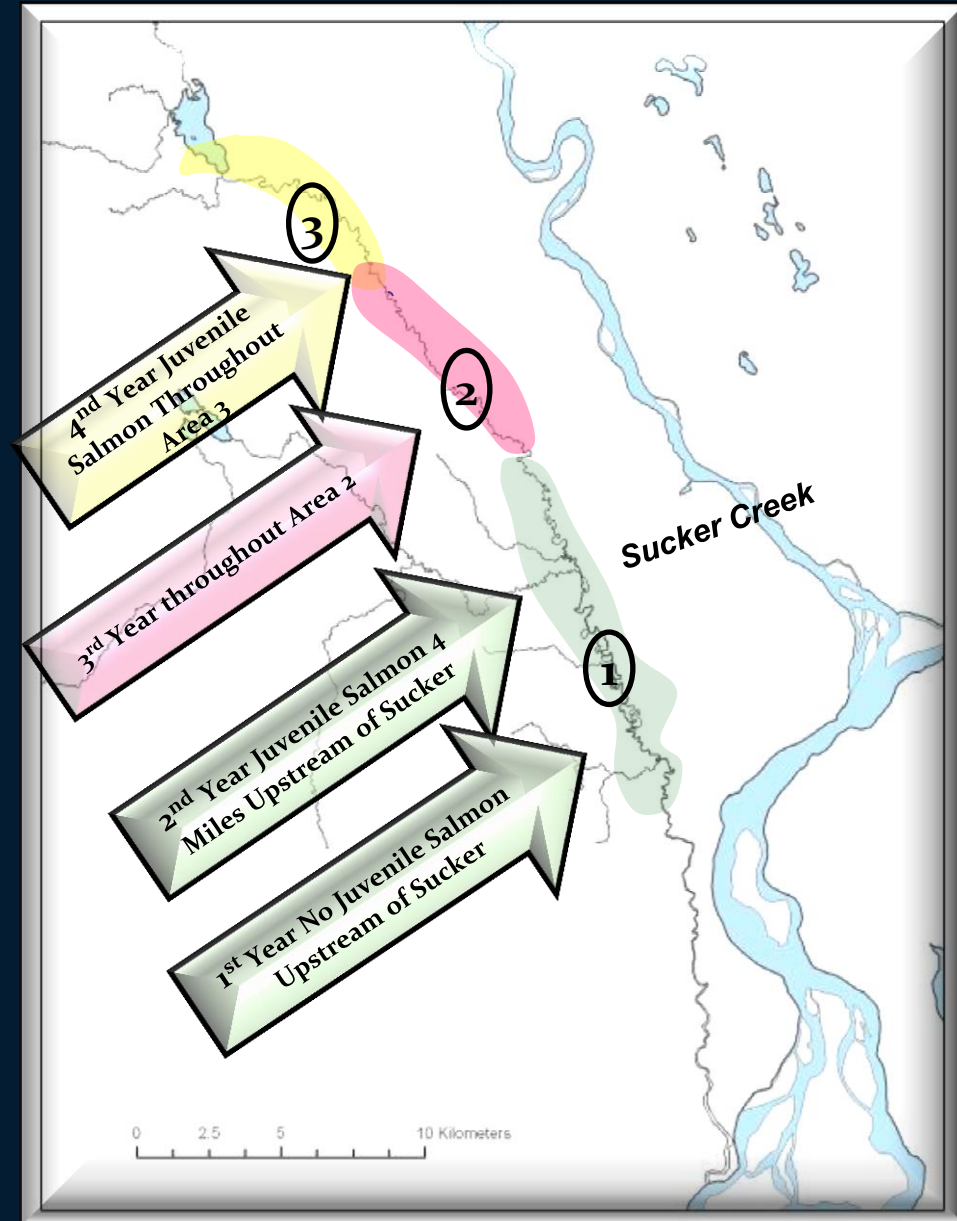


Goal: Drive down pike abundance to allow increased survival of rearing salmonids

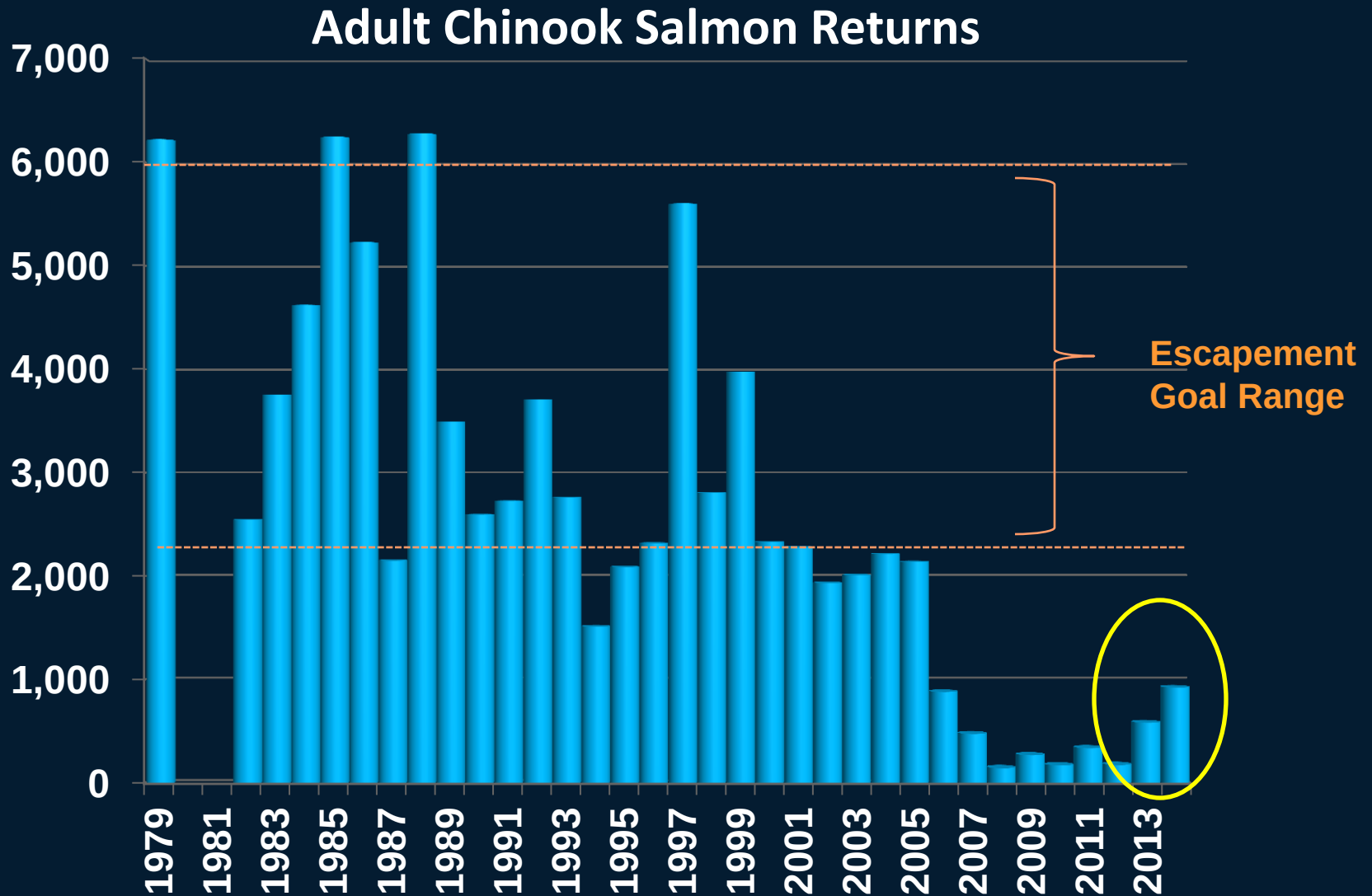
- Reduce pike in side-channel sloughs with gillnets
 - Began in 2011
 - During pike spawning
 - 3 Field crews target ~60 sloughs
 - Annual effort (15,500 pike removed since 2011)
- Surveys to evaluate juvenile salmonid abundance
 - Minnow trap surveys throughout open water period
 - Pike stomach content analysis
- USGS bioenergetics research

Alexander Creek Pike Control

Document Increase/ Decrease
in CPUE of Salmonids Between
Years and Study Sections

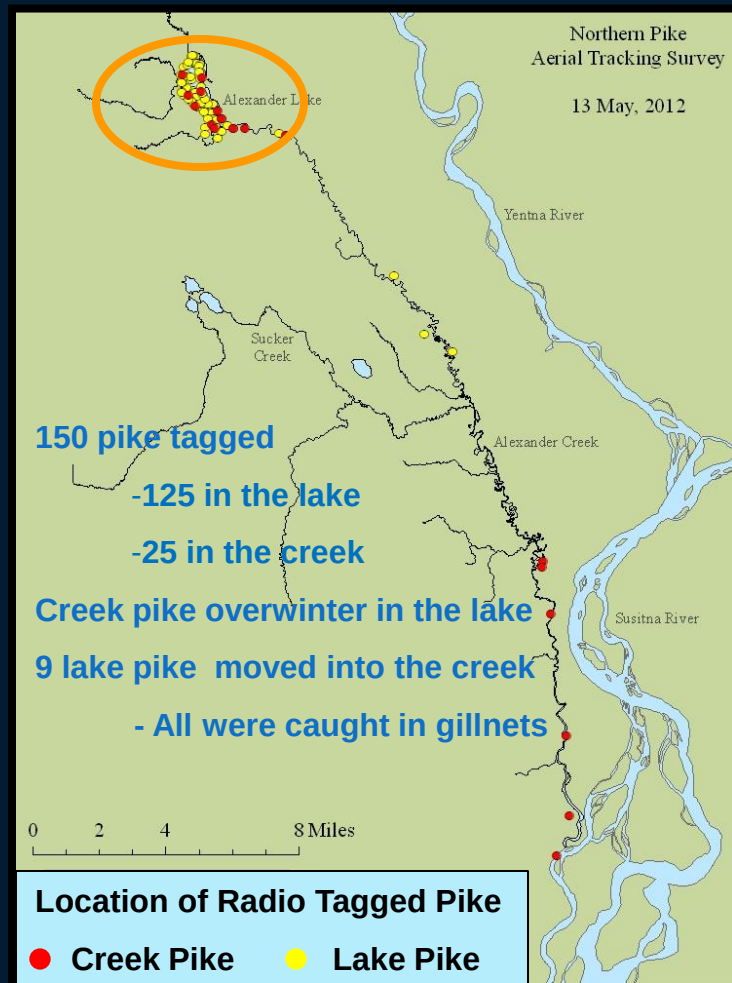


Alexander Creek Pike Control



Alexander Creek Pike Control

- Radio telemetry to study pike movements between Alexander Lake and Alexander Creek

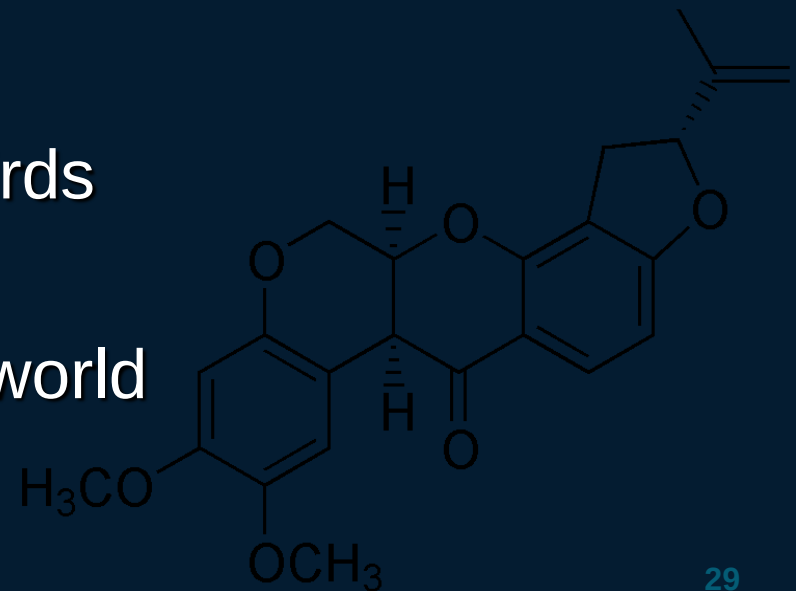


High priority pike control project

- Alexander Lake pike control would be complex
- Can we accomplish our goal focusing on sloughs?
- Yes, all pike that left the lake were caught in gillnets

Rotenone

- One of only two proven methods for eradicating fish
- Comes from tropical plant roots
- Used in the U.S. since 1930s
- Inhibits cellular respiration
- Absorbed through gills
- Used in small concentrations
- Not harmful to mammals or birds
- Commonly used for fisheries management throughout the world



Permitting Process

- State Process:
 - Obtain Alaska Board Of Fish approval
 - Receive certification to apply pesticides
 - Obtain a NPDES permit
 - Obtain Alaska Pesticide Use Permit
 - Conduct a public process
- Federal Process:
 - NEPA Review
 - Preparation of environmental assessments
 - Finding of No Significant Impact

Project Preparation



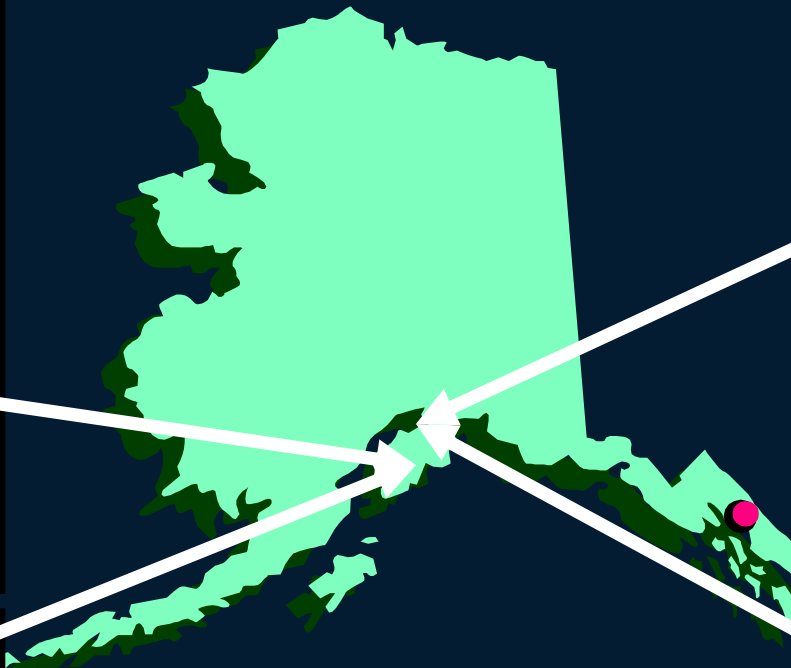
- Bathymetric Surveys
- Water Quality Monitoring
- Biological Inventory
- Fish Removal, Donation, and/ or Rescue
- Bioassays



Rotenone Application



Rotenone Projects



- Small, closed lakes, formerly stocked with rainbow trout

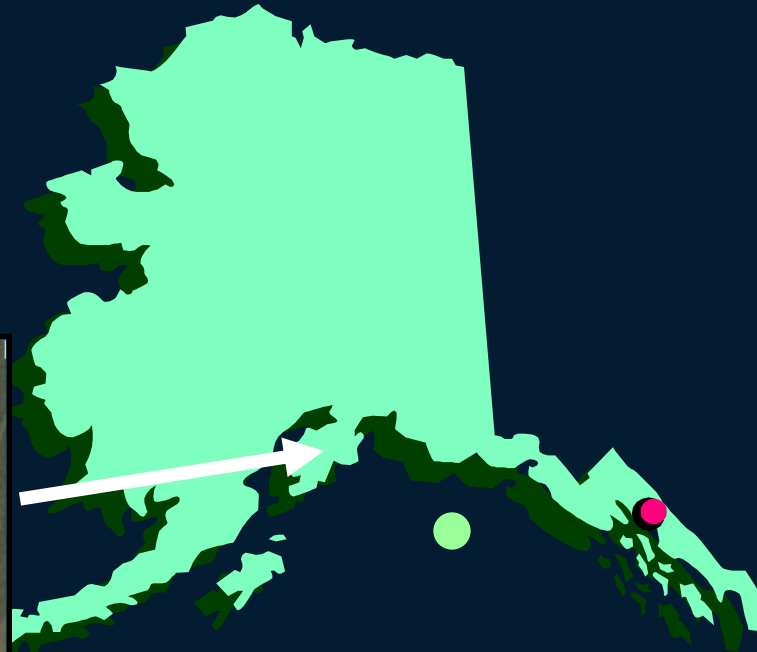
Goals: Restore fisheries

Learn application techniques

Increase public awareness

- Treatments were successful
- Fisheries restored

Stormy Lake Northern Pike Eradication



High priority pike eradication project

Stormy Lake Rotenone Treatment

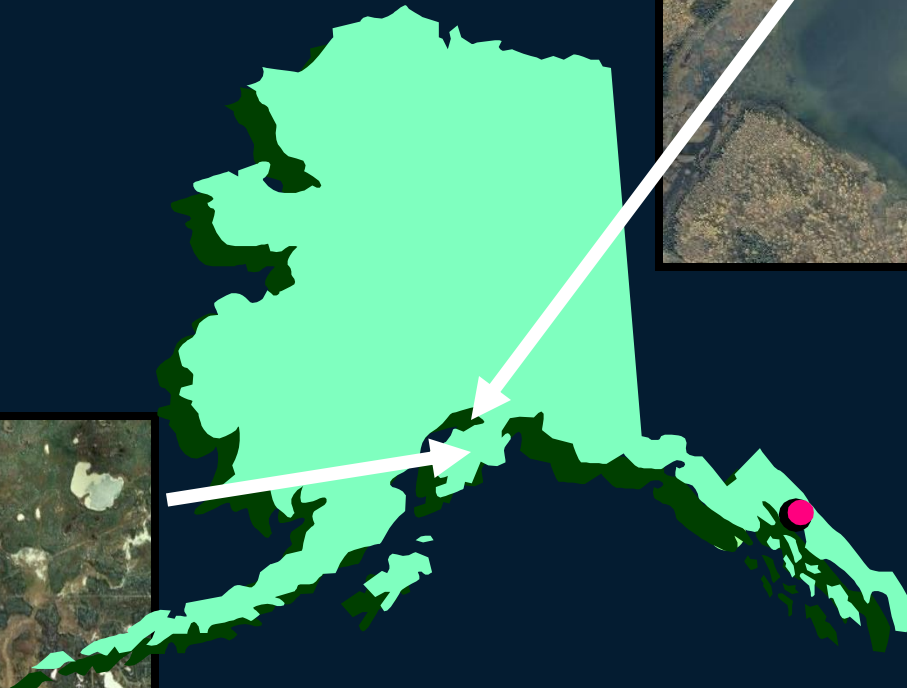
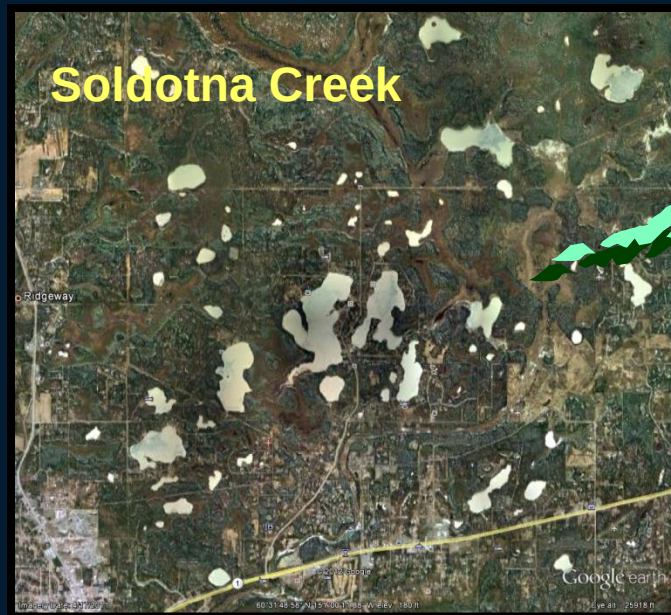


- Drainage = 240 square miles of ideal northern pike habitat
- Coho productivity at risk
- Outlet stream blocked with fyke nets for 10 years
- Native fish restoration



- Largest treatment to date (400 acres/ 50' deep)
- Goal is to prevent pike from spreading to the Swanson

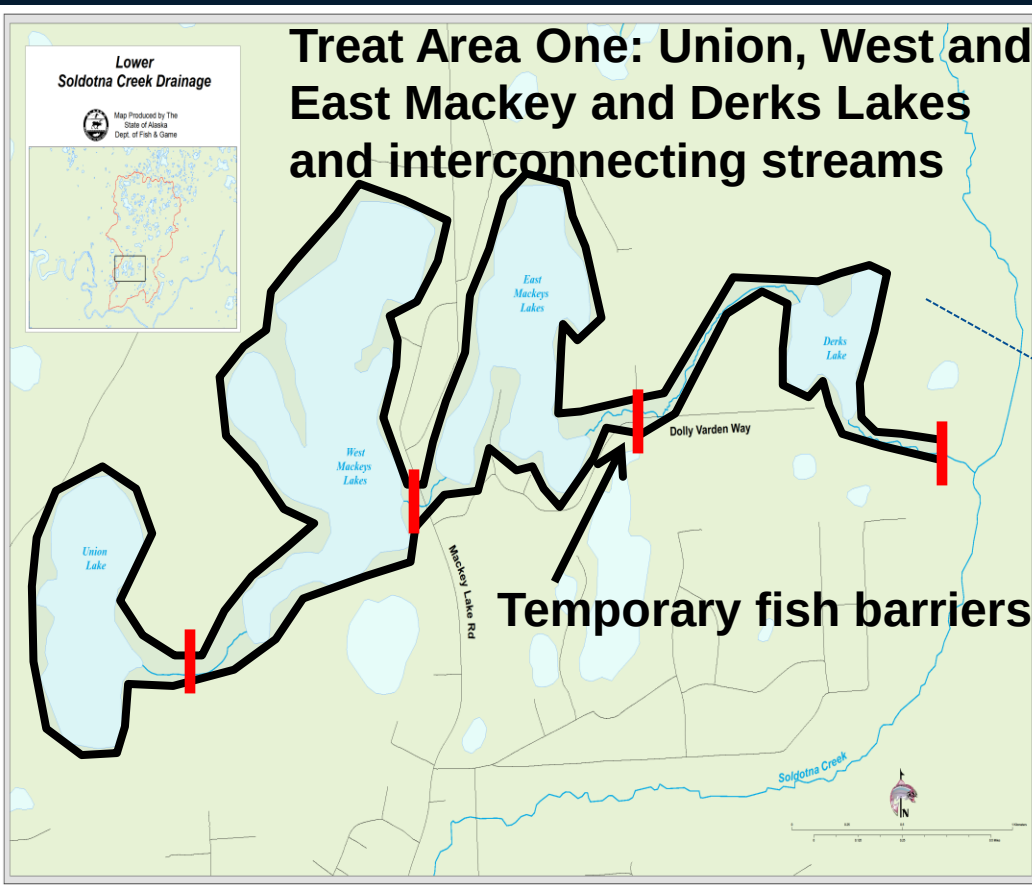
Current Rotenone Projects



Both are high priority pike eradication projects

Soldotna Creek Northern Pike Eradication

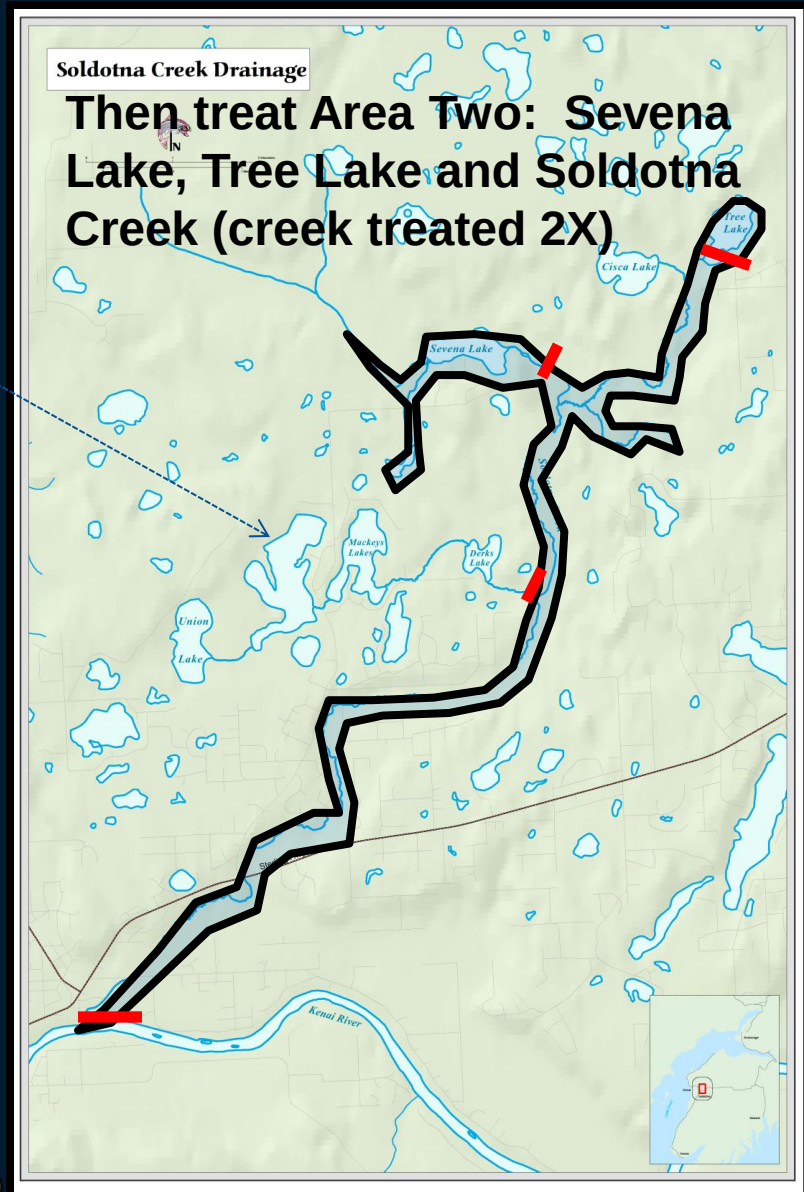
Treat Area One: Union, West and East Mackey and Derks Lakes and interconnecting streams



Temporary fish barriers

Soldotna Creek Drainage

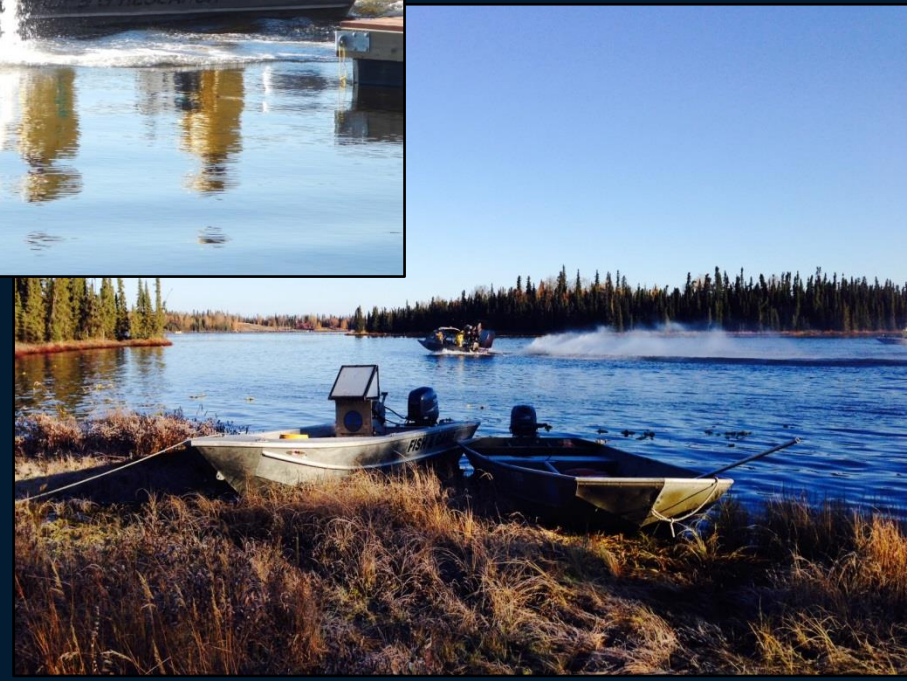
Then treat Area Two: Sevena Lake, Tree Lake and Soldotna Creek (creek treated 2X)



- First treatment in large, open system

- 4 years to complete

Goal: Prevent pike from spreading to the Moose River (where >40% of Kenai's coho productivity occurs)



Environmental DNA (eDNA)

Water samples can be used to detect aquatic species in low abundance using DNA

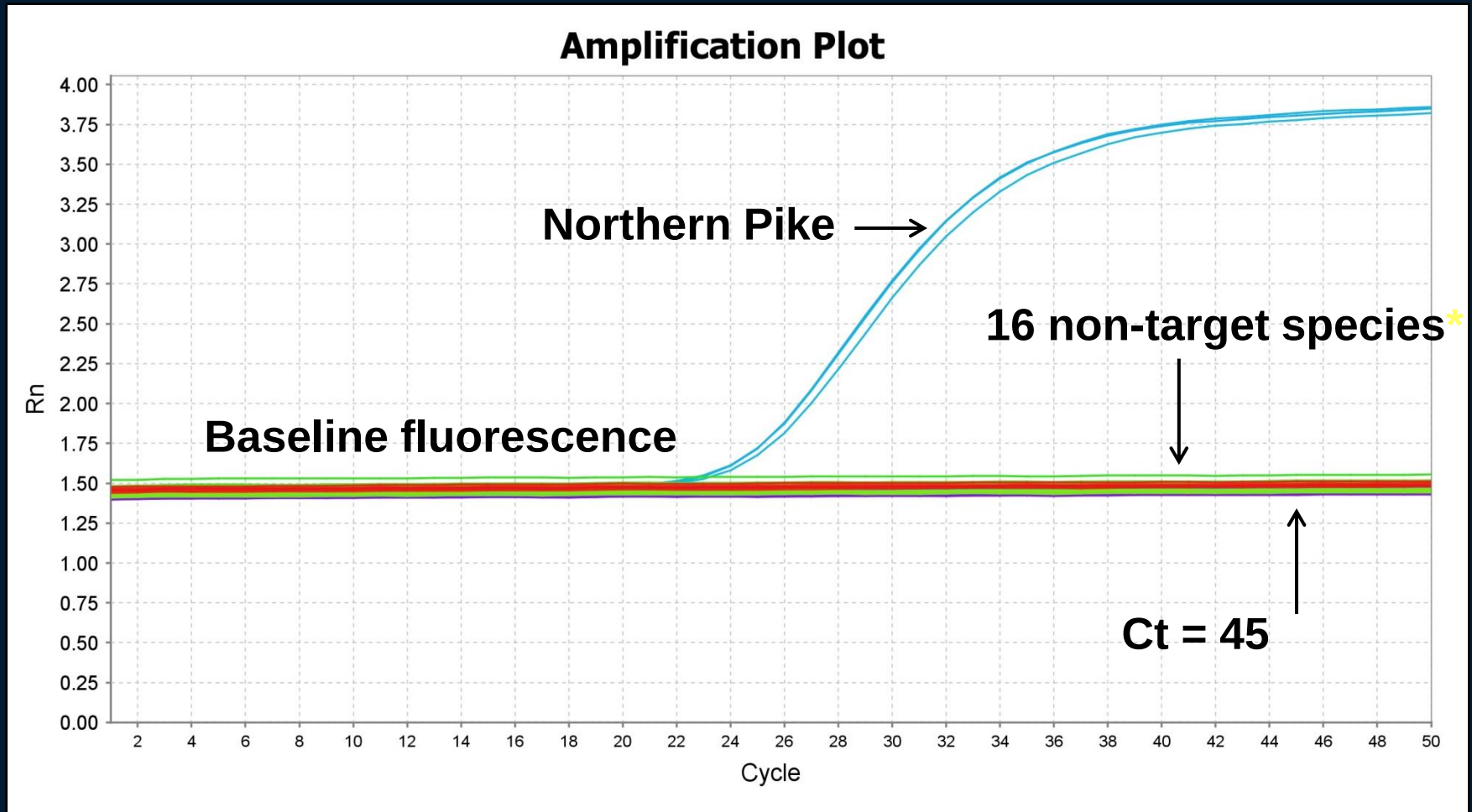


Final high priority project that is currently underway

Pike Study:

- eDNA marker development for pike
- Quantity of water for positive detection
- Detection at different distances
- Detection post-mortem
- Detection pre and post-rotenone
- Detection in open systems with and without pike

Environmental DNA (eDNA)

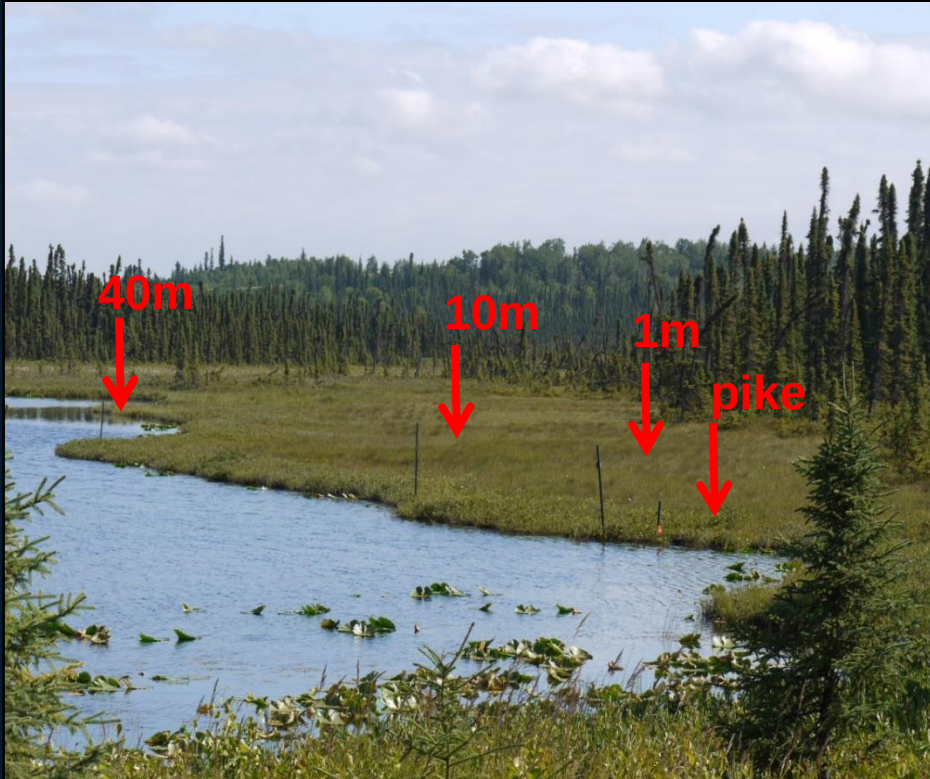


Cytochrome oxidase 1 (EluCOI)

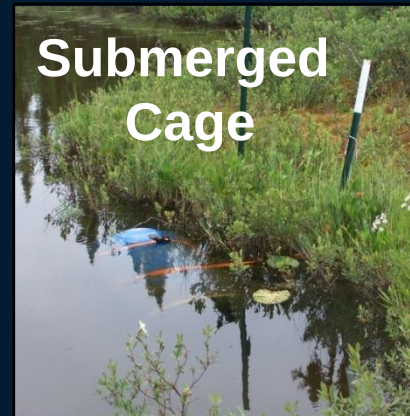
'F-5'CCTTCCCCCGCATAAATAATATAA3'

Preliminary Results

Sampling Locations Near Shore



Pike Stocking



- Pike eDNA can be detected 40 m from source
- Detection probability increases closer to source
- Pike eDNA does not persist longer than 1 week
- More to come....

Where Do We Go From Here?

- Update Management Plan
- Continue Prioritization
- Continue Education and Outreach
- Continue Eradication Efforts
- Continue Control Efforts
- Prevent Spread
- Protect Fisheries



Projects Funded By:

