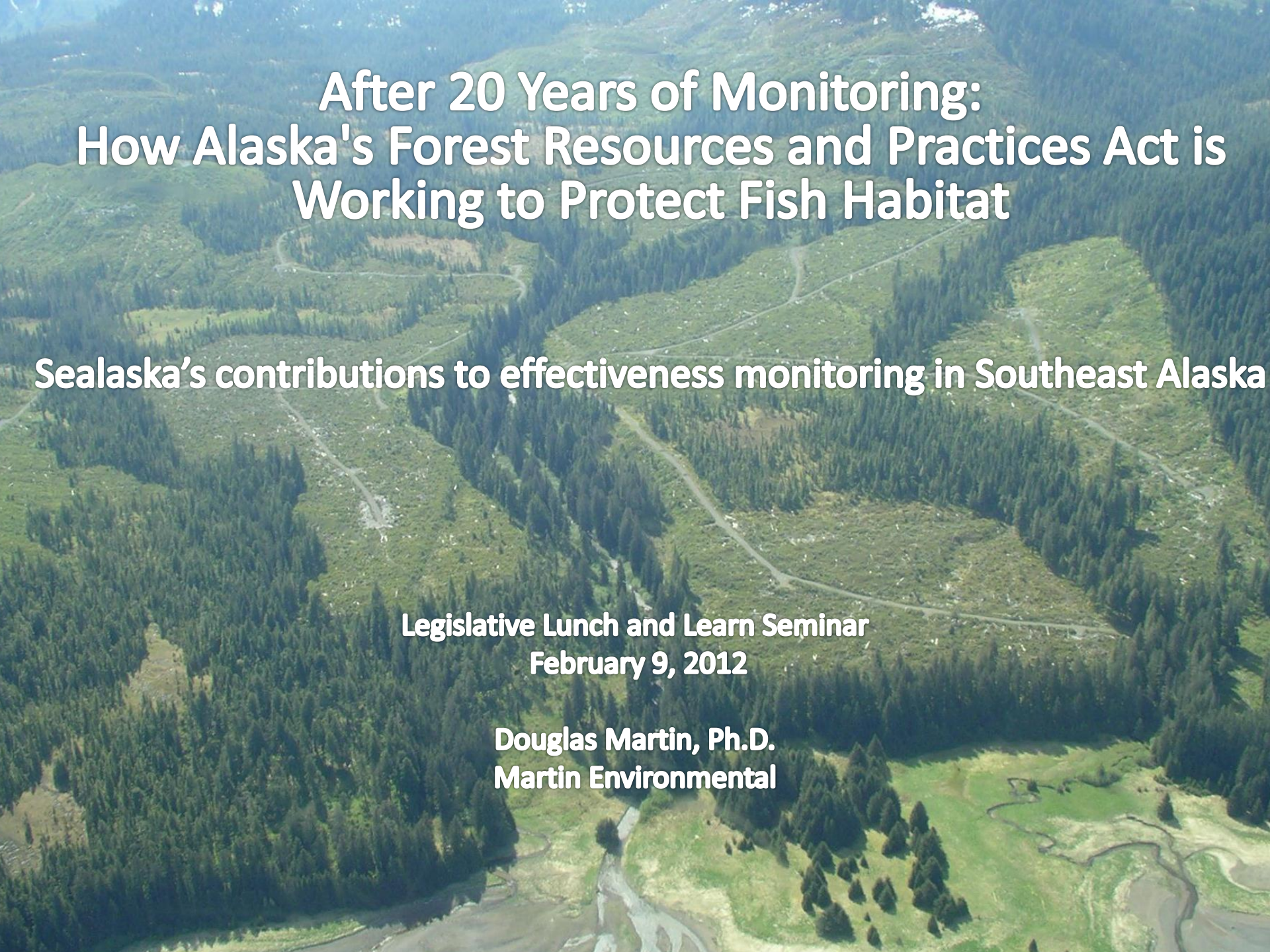


After 20 Years of Monitoring: How Alaska's Forest Resources and Practices Act is Working to Protect Fish Habitat

Sealaska's contributions to effectiveness monitoring in Southeast Alaska

Legislative Lunch and Learn Seminar
February 9, 2012

Douglas Martin, Ph.D.
Martin Environmental

After 20 Years of Monitoring: How Alaska's Forest Resources and Practices Act is Working to Protect Fish Habitat

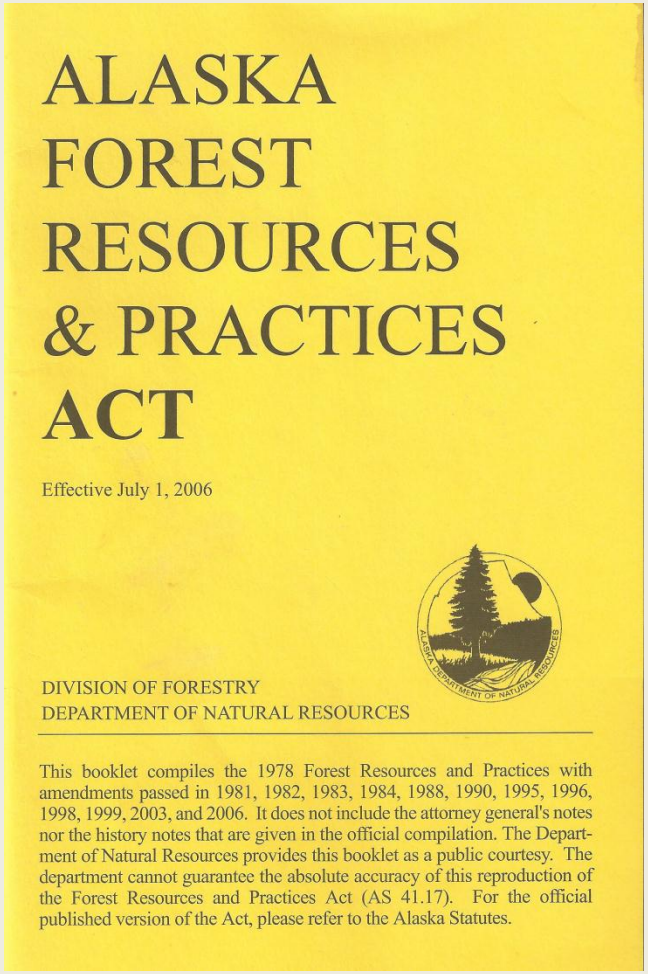
Sealaska's contributions to effectiveness monitoring in Southeast Alaska

What you will hear today:

1. Key elements of Alaska's Forest Resources and Practices Act (FRPA)
2. About Riparian Areas
3. How Buffers Work
4. Primary Goal of FRPA: Preservation of Fish Habitat

Key Elements of Alaska's Forest Resources and Practices Act (FRPA)

Alaska Forest Resources and Practices Act (FRPA)



A major revision was adopted 1990 and it was implemented 1992

- Management of Riparian Areas (Sec. 41.17.115)
- Riparian Standards for Private Lands (Sec. 41.17.116)

Riparian *refers to anything relating to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater.*

Management of Riparian Areas
(Sec. 41.17.115)

Key elements

- The state forester shall protect riparian areas from the significant adverse effects of timber harvest activities on fish habitat and water quality.

- The management intent is the adequate preservation of fish habitat by maintaining a short- and long-term source of large woody debris, stream bank stability, channel morphology, water temperatures, stream flows, water quality, adequate nutrient cycling, food sources, clean spawning gravels, and sunlight.

- The regulations must take into consideration the economic feasibility of timber operations.

Large woody debris *or* ***LWD*** *refers to the trees, logs, and other large wood that falls into streams and rivers.*

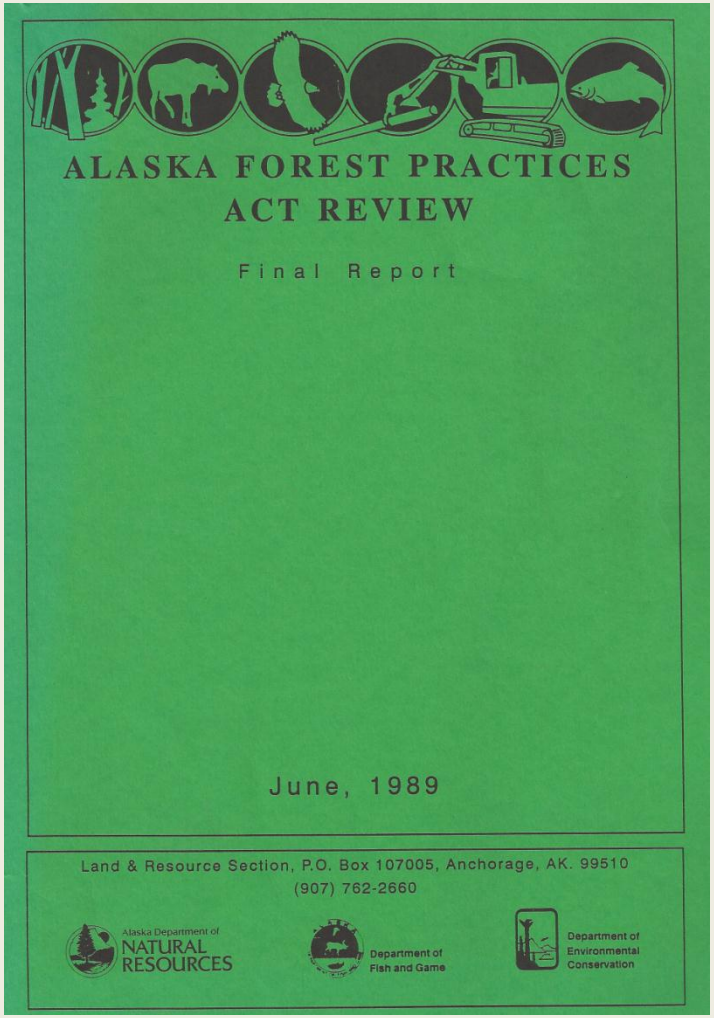
Riparian Standards for Private Lands
(Sec. 41.17.116)

<u>Established stream channel types by habitat</u>

- Along anadromous fish streams:
  - No timber harvest allowed within 66 feet (variation permit)
  - Operations within 100 feet or to slope break shall be conducted in compliance with slope stability standards (i.e., additional restrictions on timber harvest, timber felling, yarding, road construction)

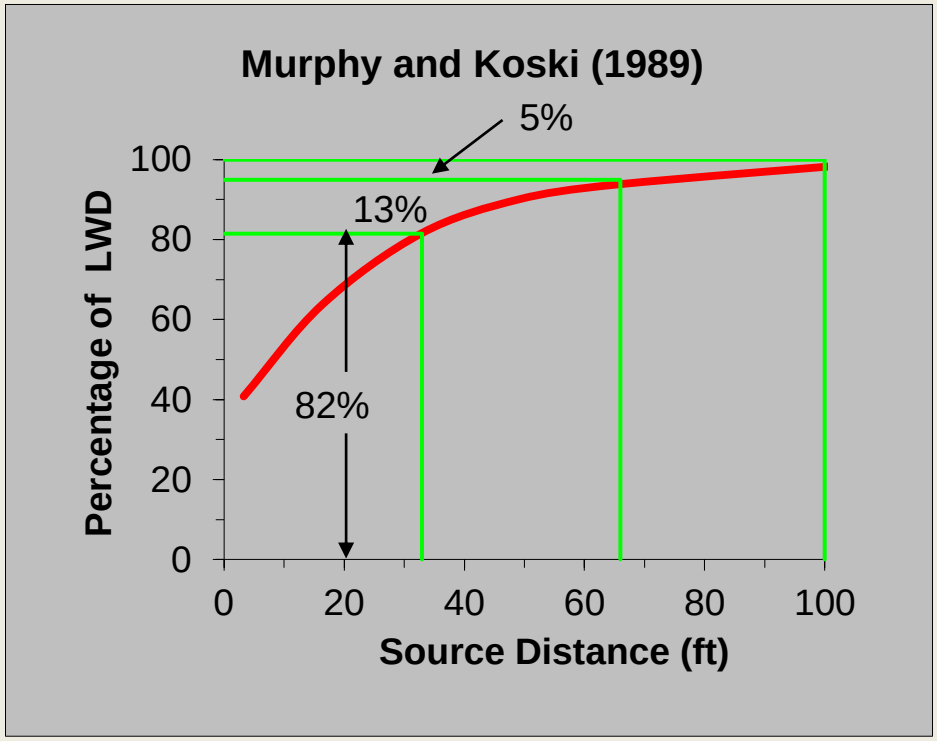
- Along non-anadromous fish streams:
  - Operators shall retain low-value timber within 25 feet or to slope break
  - Must comply with slope stability standards (width varies by stream type)

Anadromous refers to fish that originate in freshwater, migrate to sea during their adult phase and return to freshwater to breed.



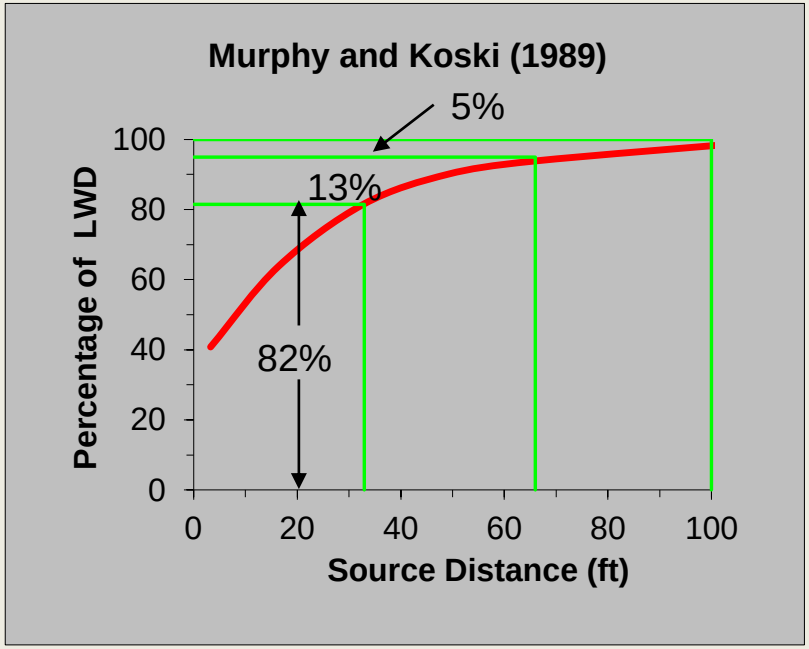
Source Distance Concept

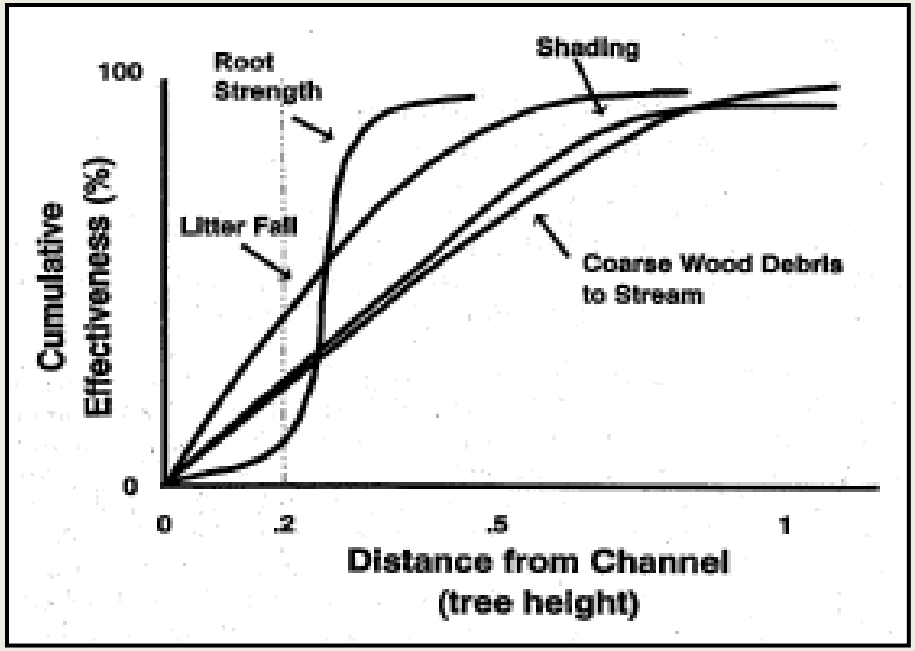
A major influence on rule development of buffer strip width



Up to 95 percent of large woody debris (LWD) from riparian stands is within 66 feet of the stream edge.

Protection of Riparian Stands for Large Wood Supply also Maintains other Riparian Ecological Functions



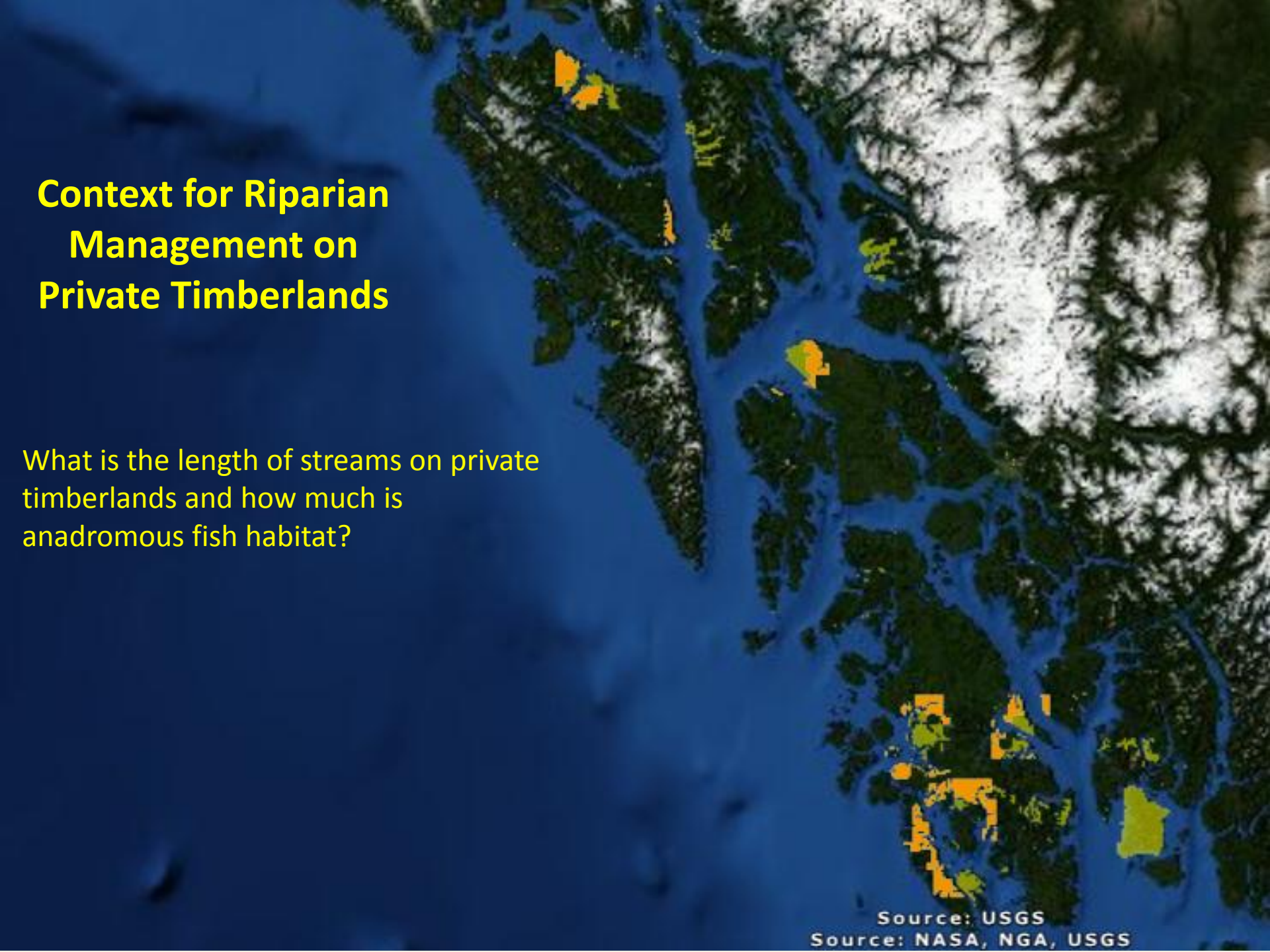


The influence of riparian ecological functions (large wood, shade, litter, etc.) decreases with distance from the stream edge (from FEMAT 1993).

About Riparian Areas

Context for Riparian Management on Private Timberlands

What is the length of streams on private timberlands and how much is anadromous fish habitat?

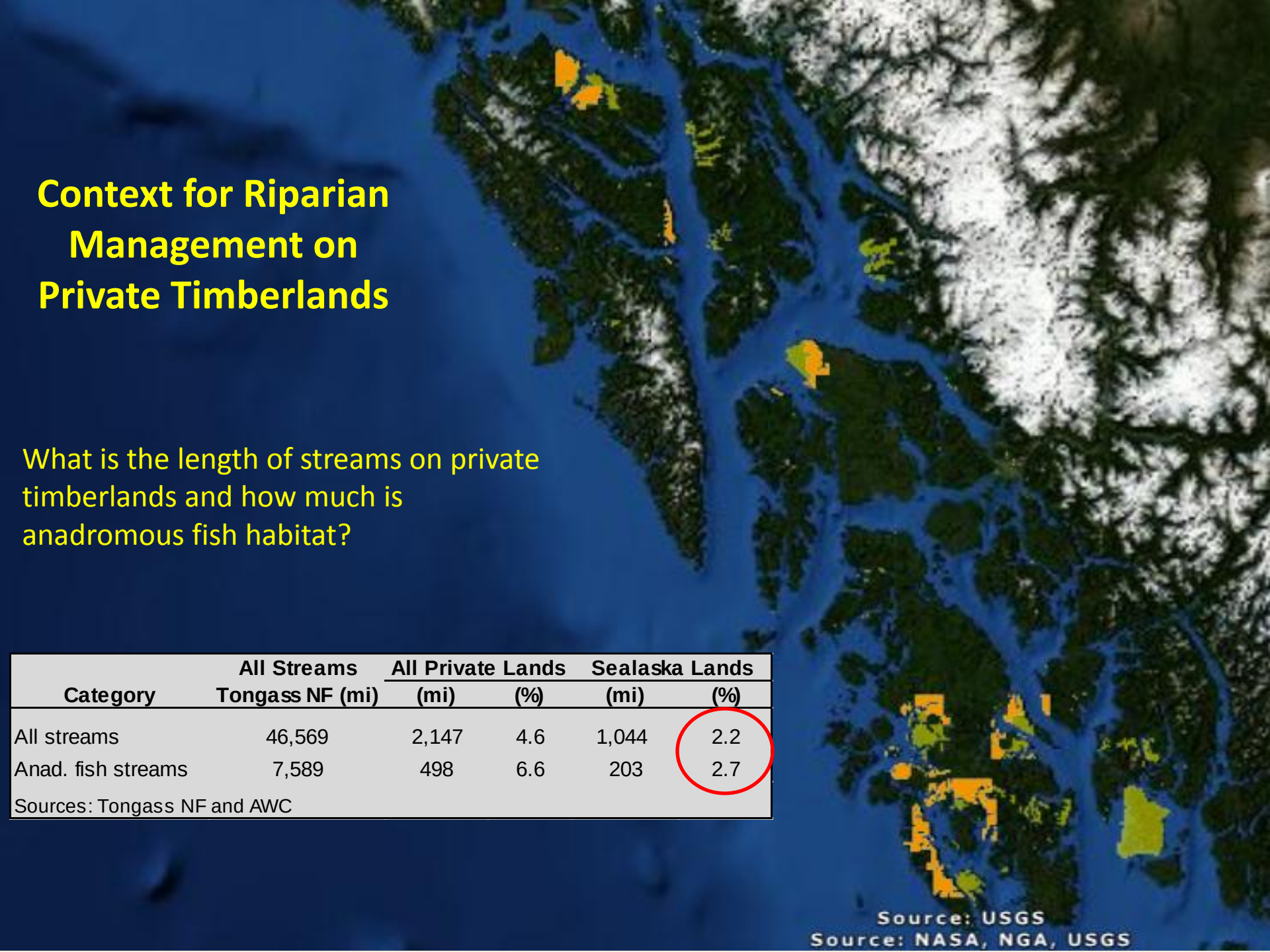


Context for Riparian Management on Private Timberlands

What is the length of streams on private timberlands and how much is anadromous fish habitat?

Category	All Streams Tongass NF (mi)	All Private Lands (mi)	All Private Lands (%)	Sealaska Lands (mi)	Sealaska Lands (%)
All streams	46,569	2,147	4.6	1,044	2.2
Anad. fish streams	7,589	498	6.6	203	2.7

Sources: Tongass NF and AWC

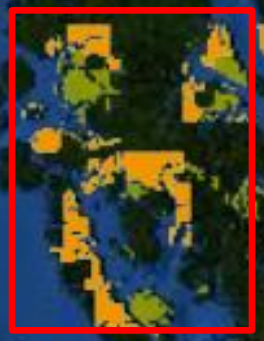


Context for Riparian Management on Private Timberlands

What is the actual amount/width of buffer strips that are being retained under the new rules?

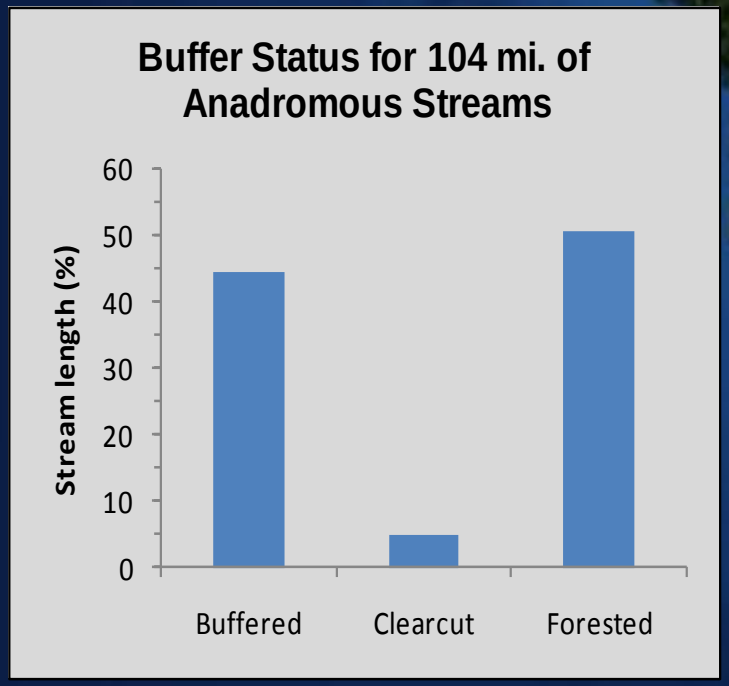
An inventory of buffer strips on Sealaska lands in POW area based on 2005 aerial photography found:

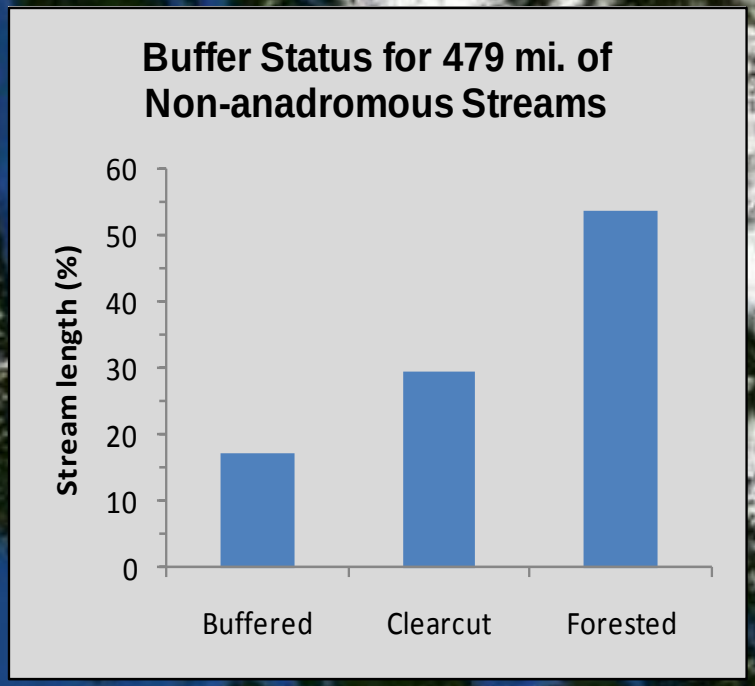
- 583 miles of stream
- 18% anadromous fish streams
- 82% non-anadromous fish streams



Source: USGS
Source: NASA, NGA, USGS

Buffer Strips on Sealaska Lands
(1980 – 2005)



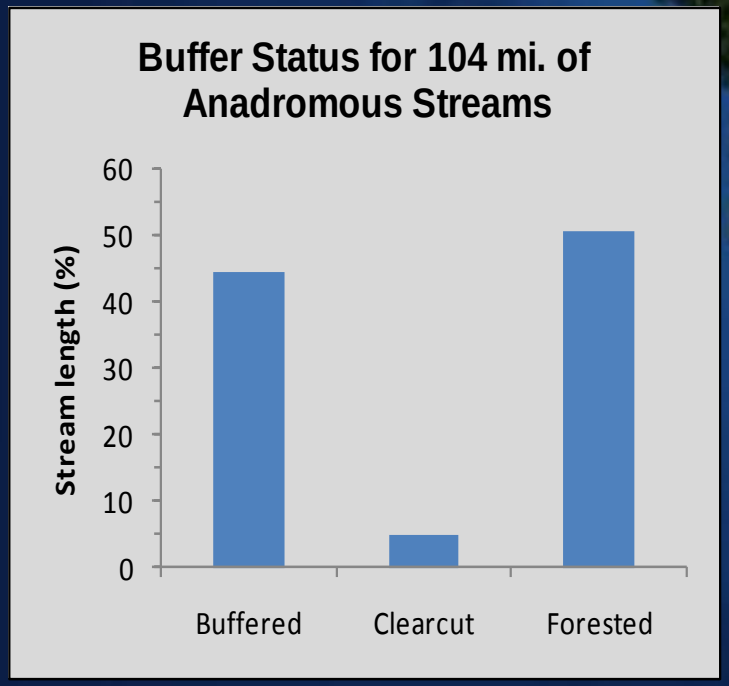


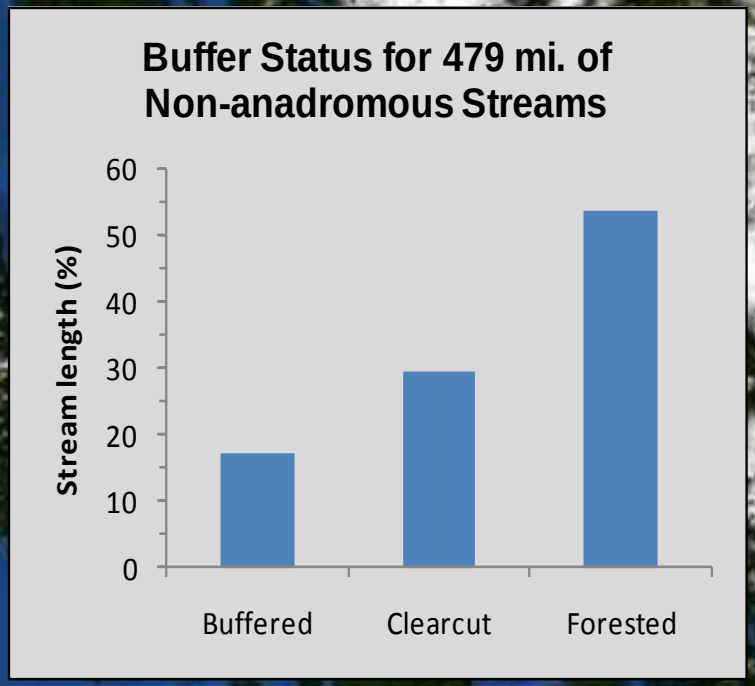
- 44% buffered (min. 66 feet wide after 1992)
- 5% have no buffers
- 51% have wide (>300 feet) forested riparian

- 17% have some buffering
- 29% has no buffers
- 54% have wide (>300 feet) forested riparian

Source: USGS
Source: NASA, NGA, USGS

Buffer Strips on Sealaska Lands
(1980 – 2005)





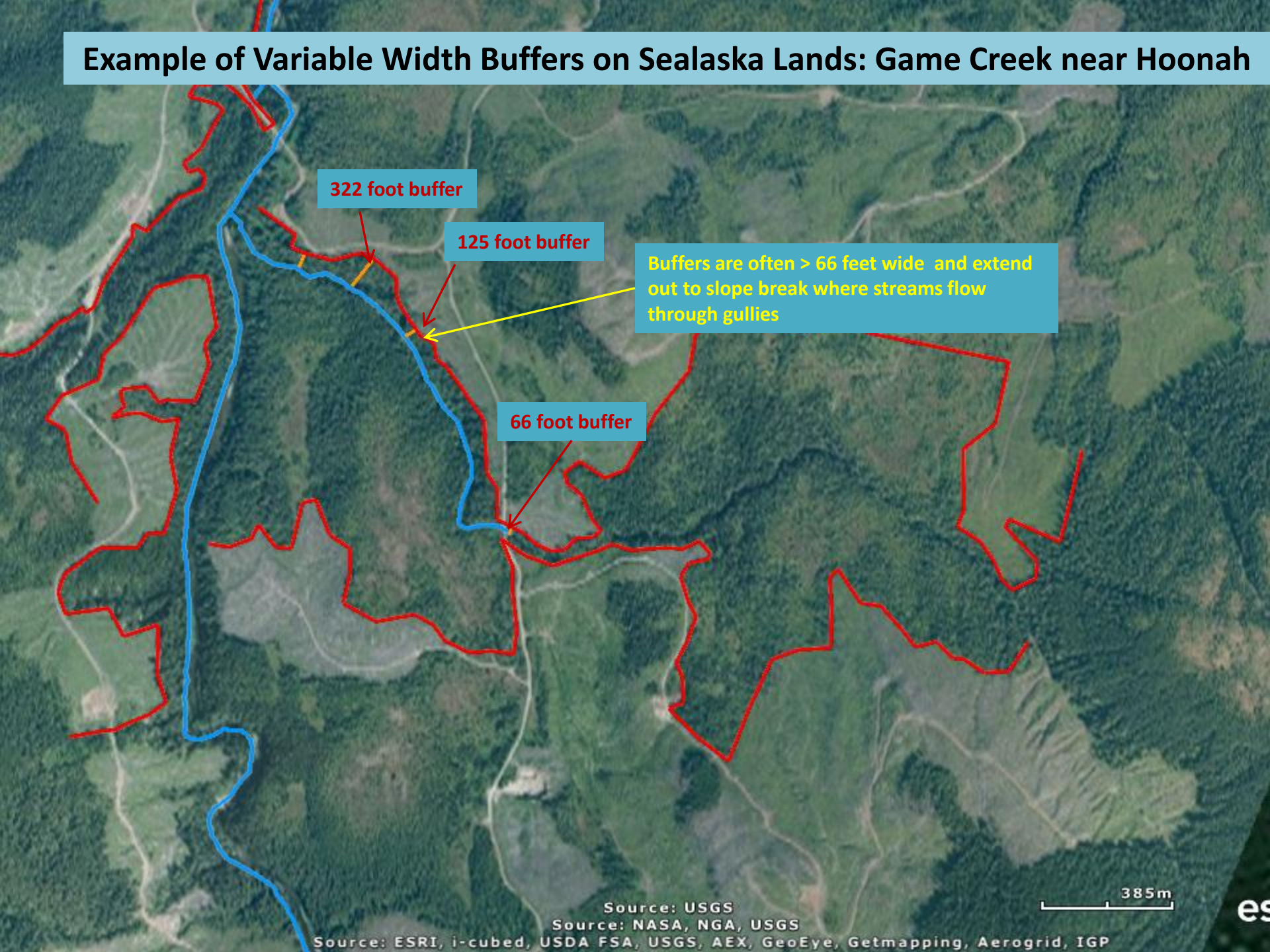
- 44% buffered (min. 66 feet wide after 1992)
- 5% have no buffers
- 51% have wide (>300 feet) forested riparian

- 17% have some buffering
- 29% has no buffers
- 54% have wide (>300 feet) forested riparian

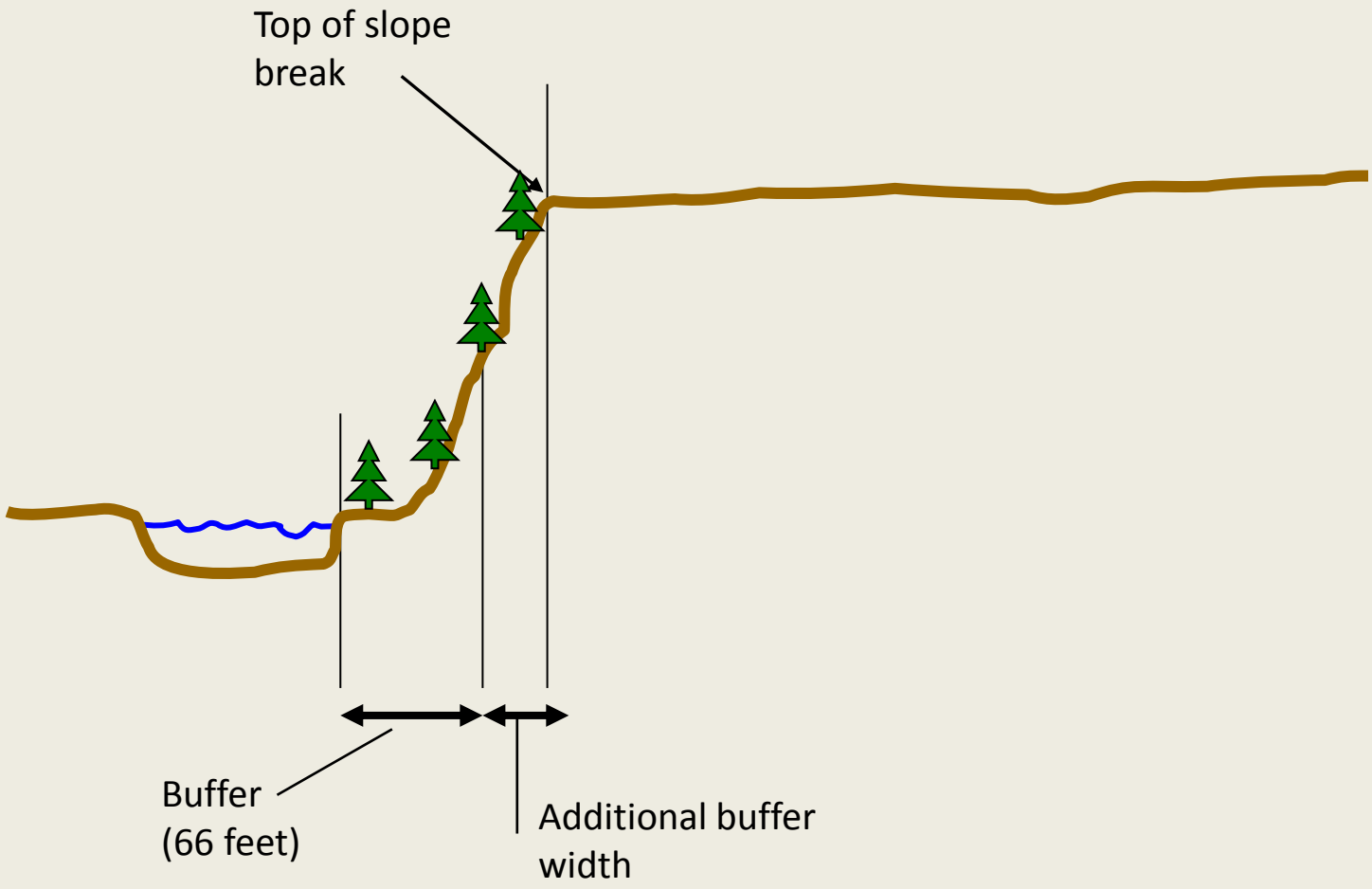
Conclusion:
Most anadromous fish streams have buffers that are 66 feet wide or greater.
A large percentage of non-anadromous fish streams have buffers and most have no adjacent logging.

Source: NASA, NGA, USGS

Example of Variable Width Buffers on Sealaska Lands: Game Creek near Hoonah



Buffer Width Based on Riparian Rule and Slope Stability Rules



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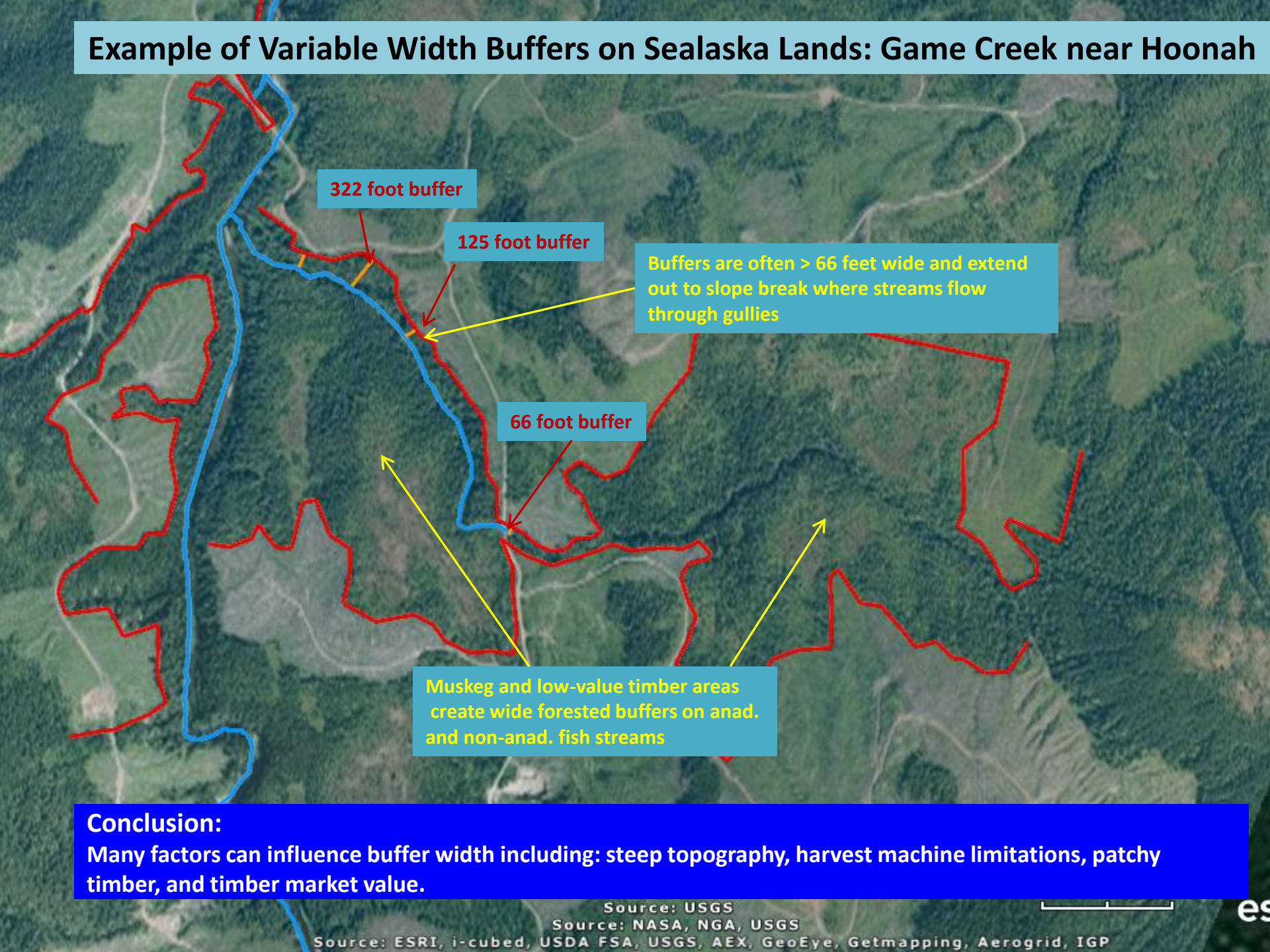


Conclusion:

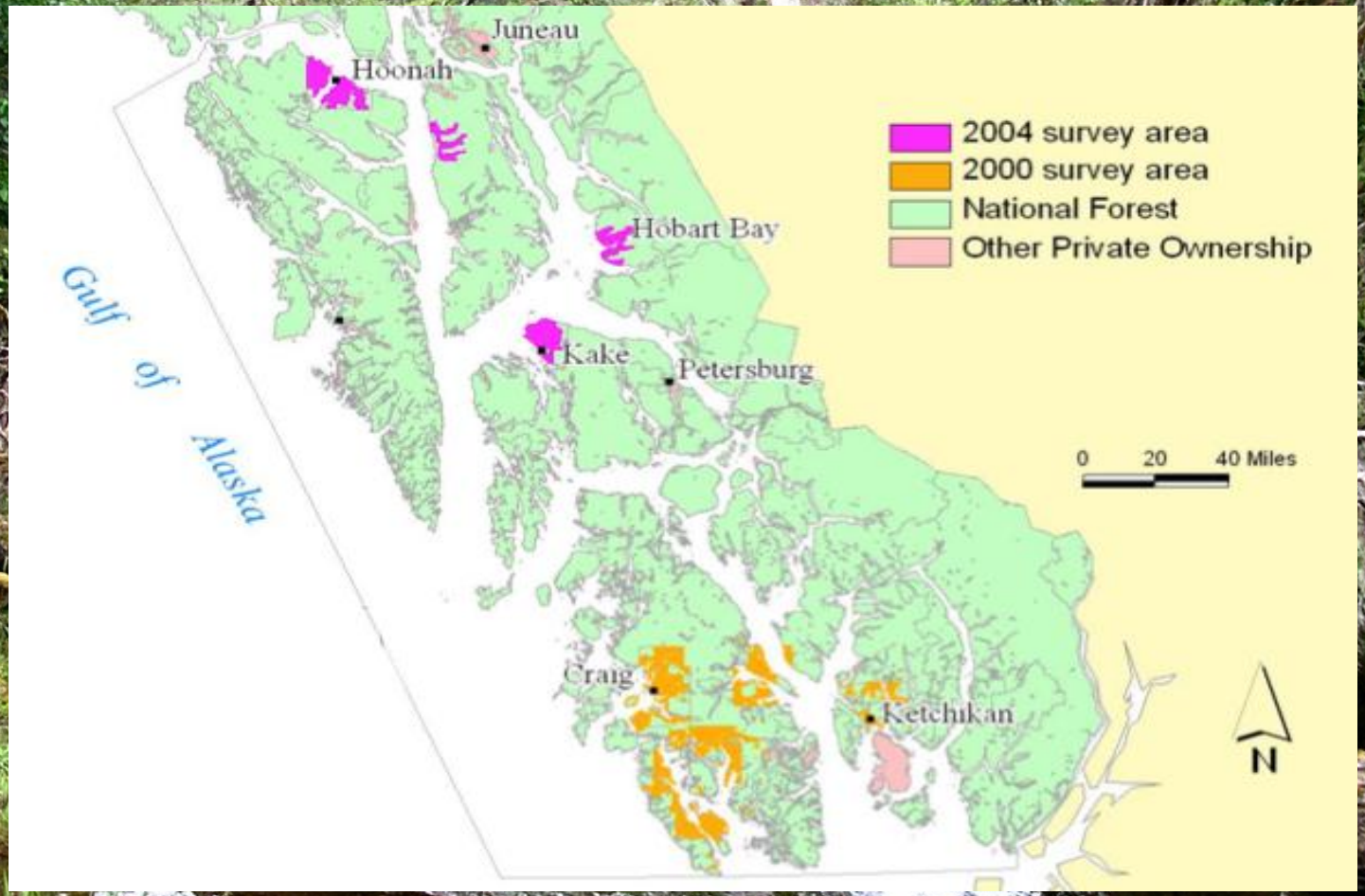
Many factors can influence buffer width including: steep topography, harvest machine limitations, patchy timber, and timber market value.

How Buffers Work

Windthrow in Buffer Strips

How does windthrow affect large wood recruitment to streams and the long-term supply of LWD in riparian stands?

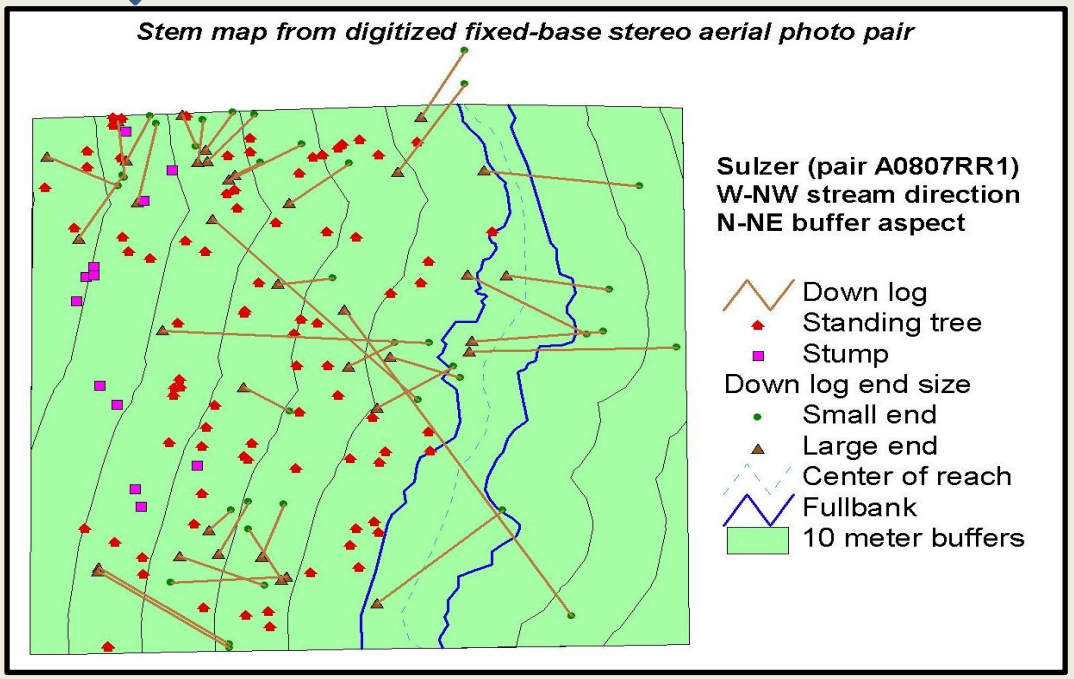
Windthrow Study on all Private Timberlands



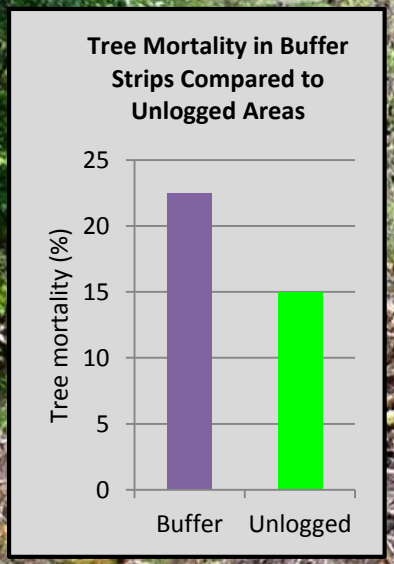
Inventory of Windthrow and Riparian Stand Composition

Using large-scale (1:2000) aerial photography

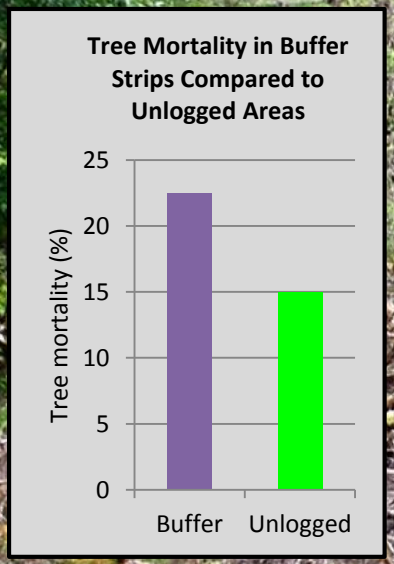
Data collected from 124 paired logged and unlogged sample sites that were randomly selected from 1,490 photos.

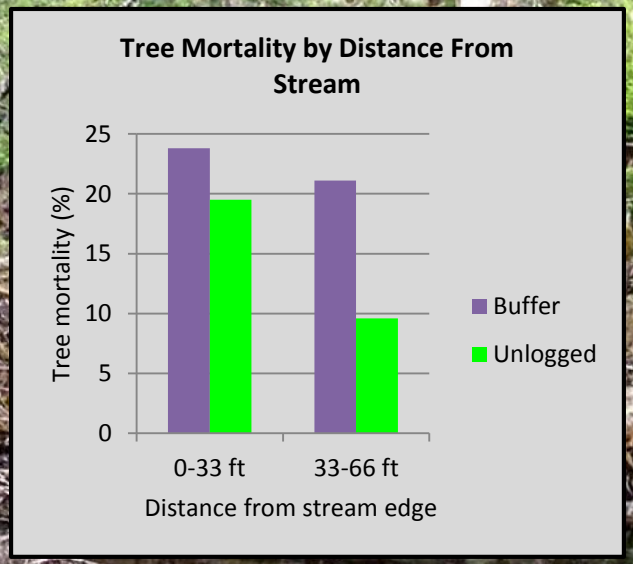


Windthrow in Buffer Strip Findings

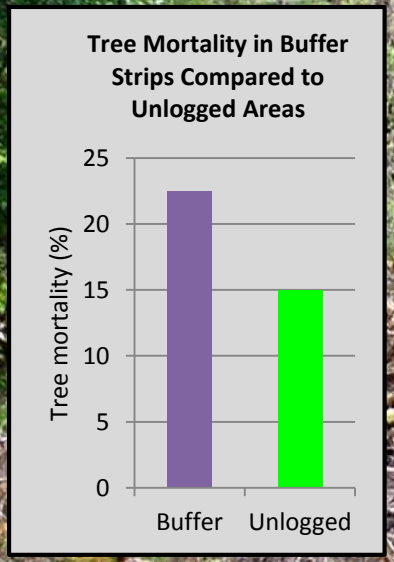


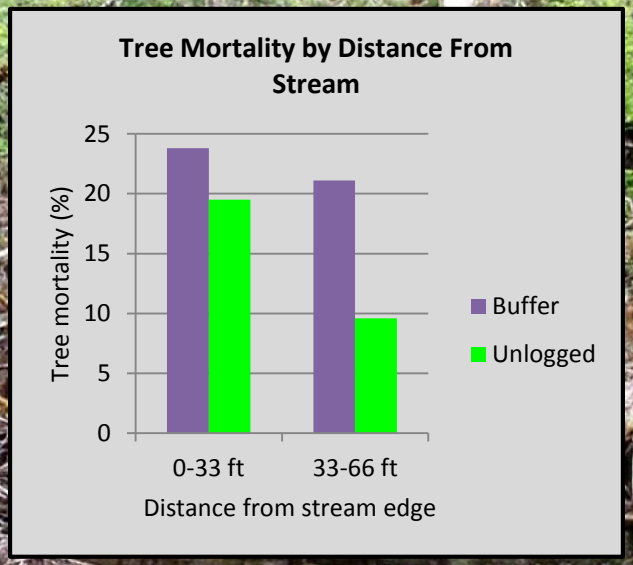
Windthrow in Buffer Strip Findings

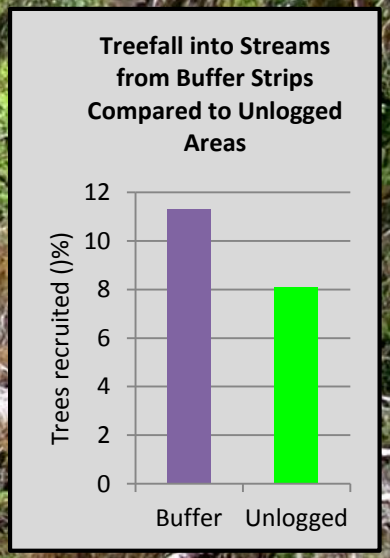




Windthrow in Buffer Strip Findings







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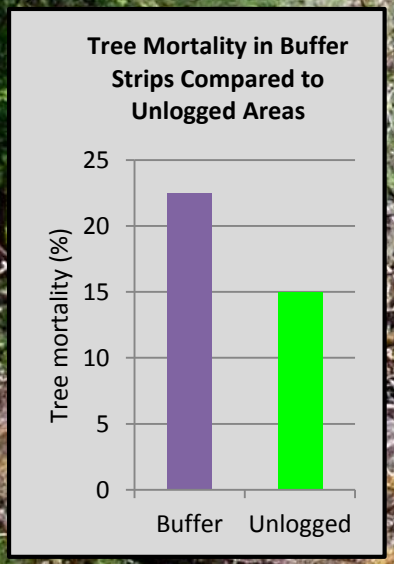
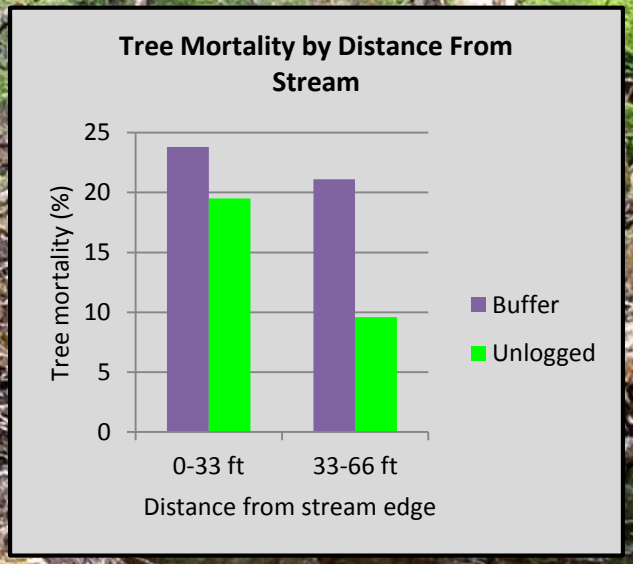
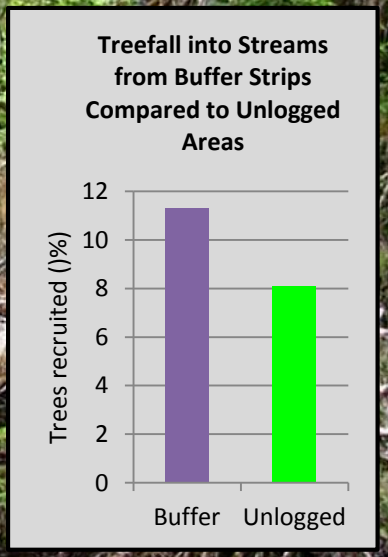






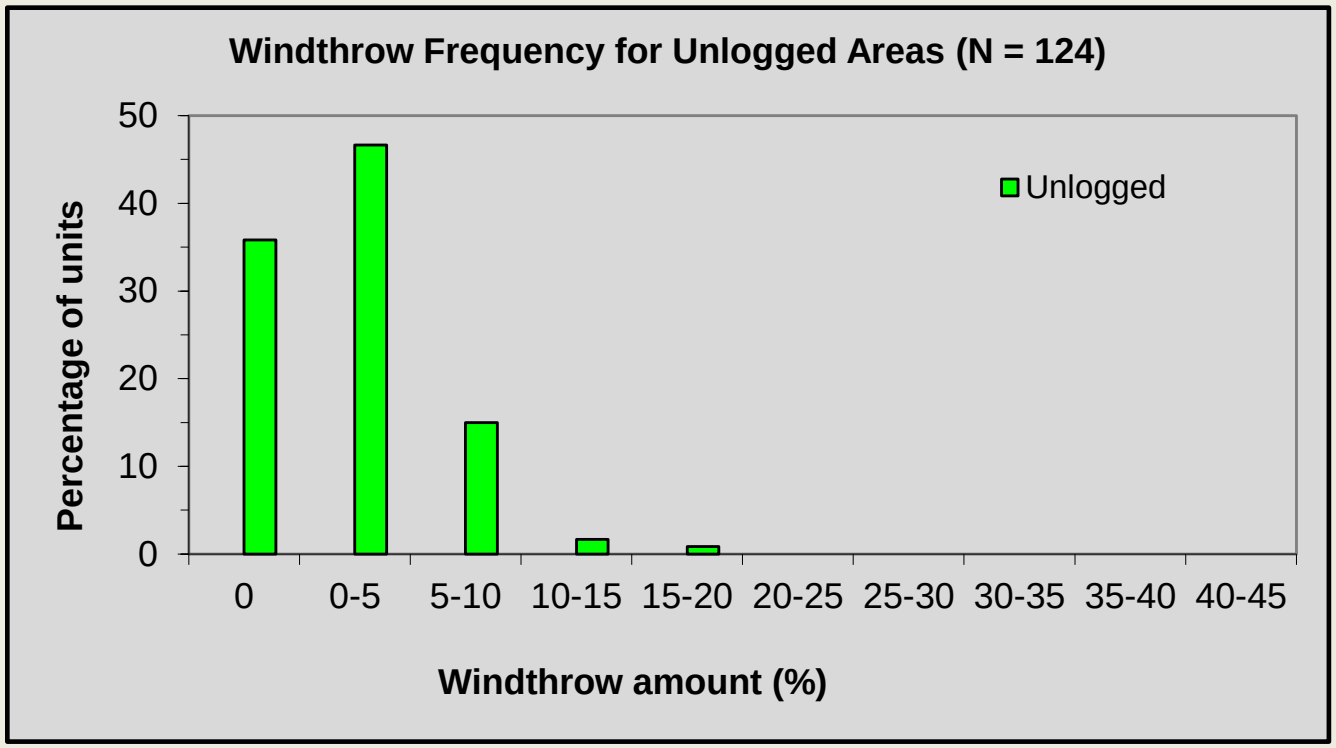
Conclusions:

1) Windthrow increases riparian stand mortality.

2) Mortality increases are greatest in the outer portion of the buffer strip.

3) Windthrow increases wood recruitment to streams.

How Much Windthrow Occurs Across the Landscape?



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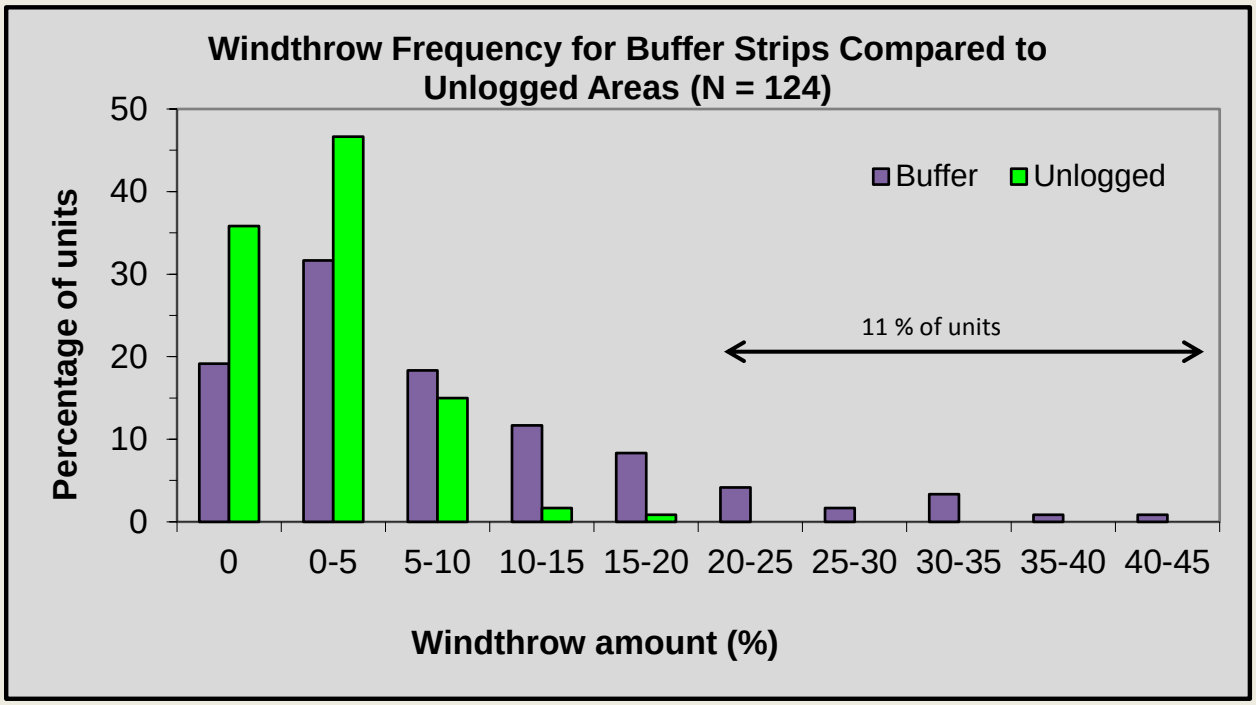

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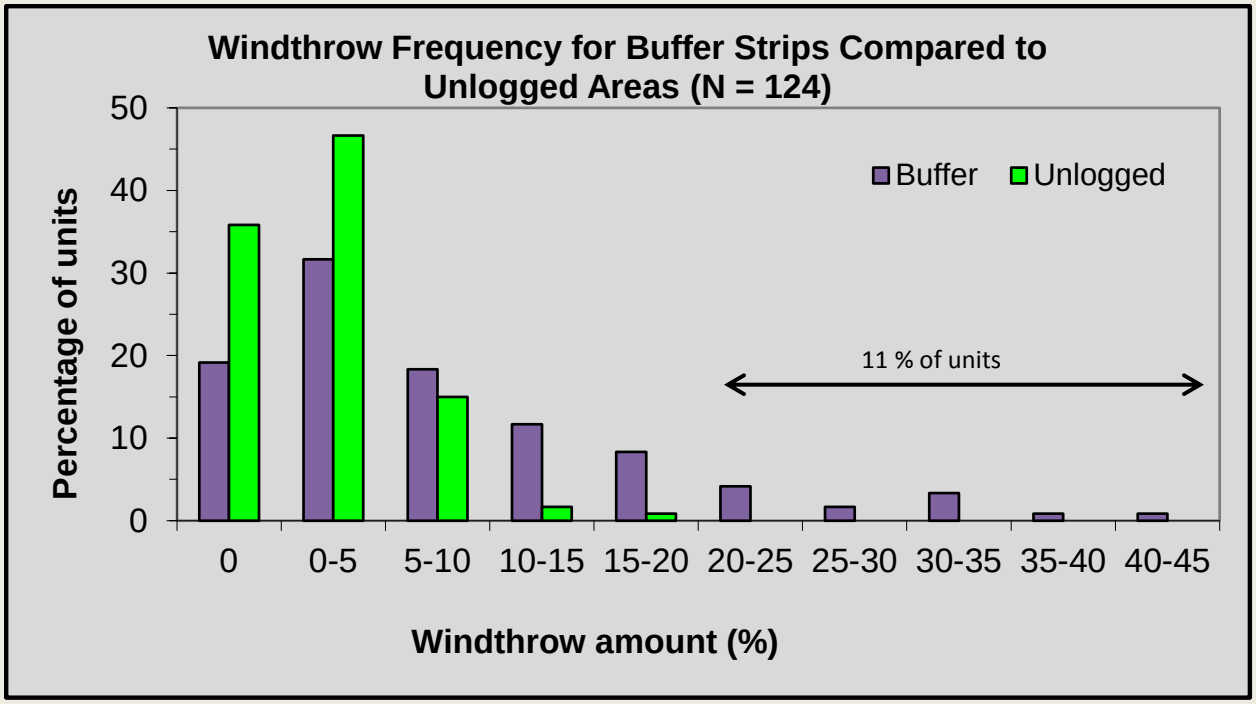
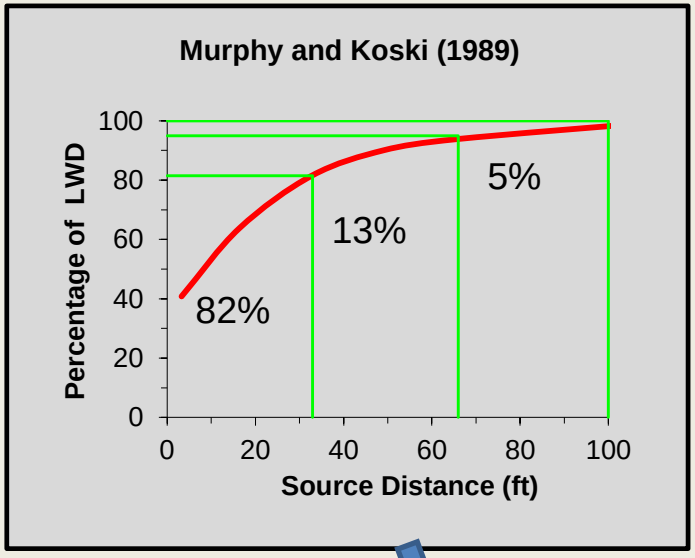
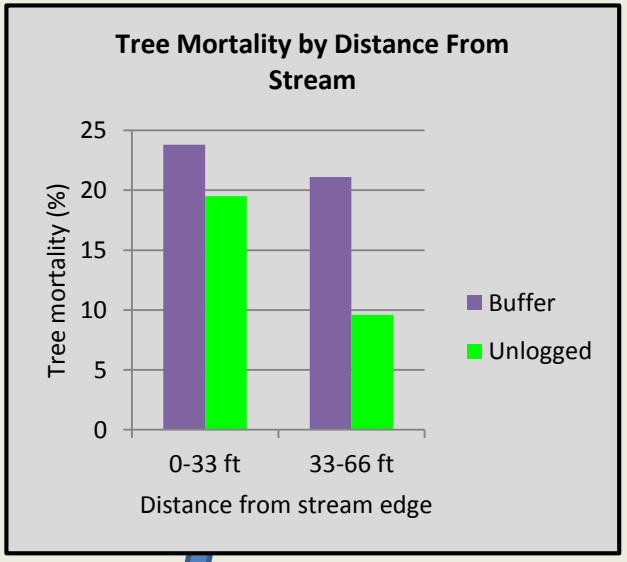


Conclusion:
Most tree mortality in buffer strips is within the natural range observed in unlogged riparian stands.

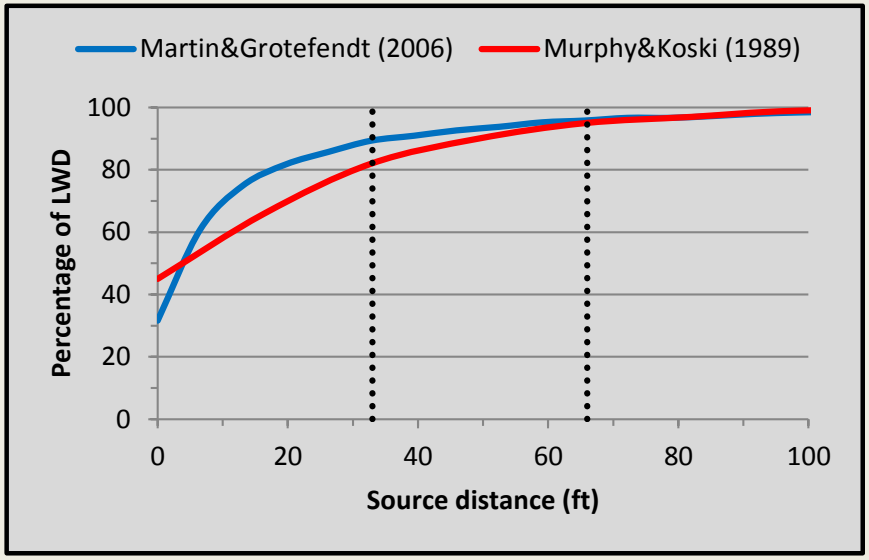
Windthrow and Future Long-term Supply of LWD

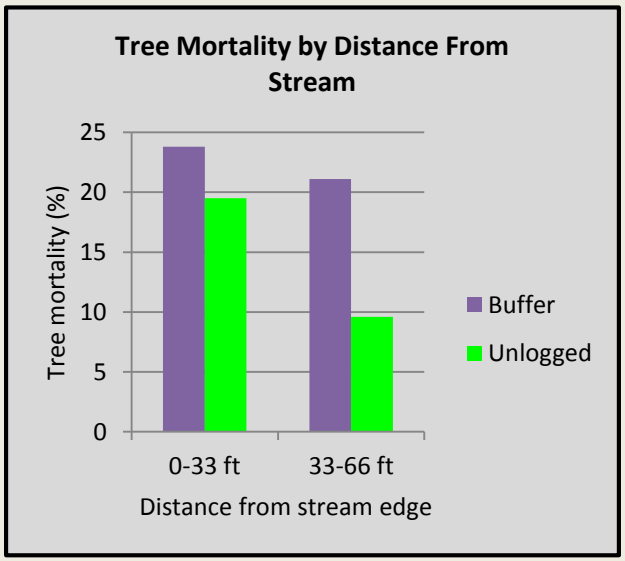




Zone	Potential Supply (%)	Avg. Stand Loss	Future Supply (%)
0-33 ft	82	0.043	78.5
33-66 ft	13	0.115	11.5
>66 ft	5	1.000	0
	100		90.0

Windthrow and Future Long-term Supply of LWD





Zone	Potential Supply (Martin & Grotefendt) (%)	Avg. Stand Loss	Future Supply (%)
0-33 ft	89.4	0.043	85.6
33-66 ft	6.4	0.115	5.7
>66 ft	4.2	1.000	0
	100		91.2

Zone	Potential Supply (Murphy & Koski) (%)	Avg. Stand Loss	Future Supply (%)
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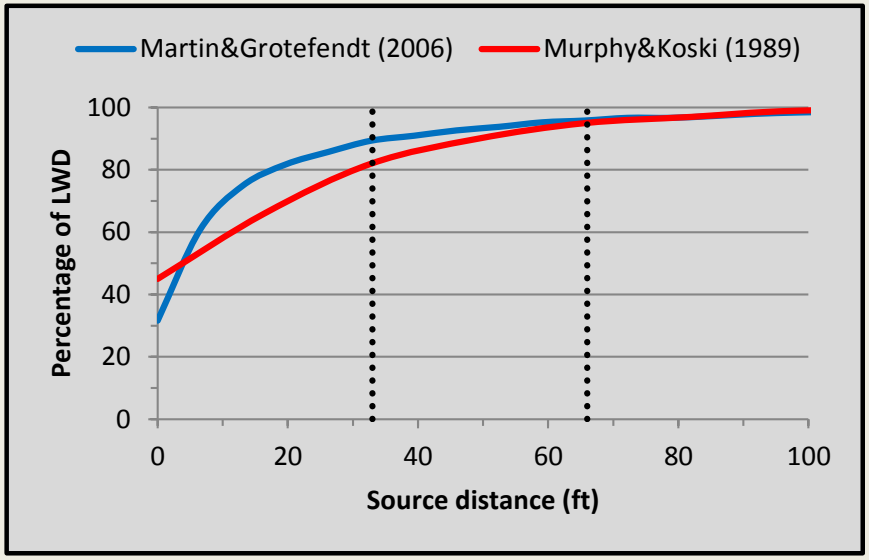
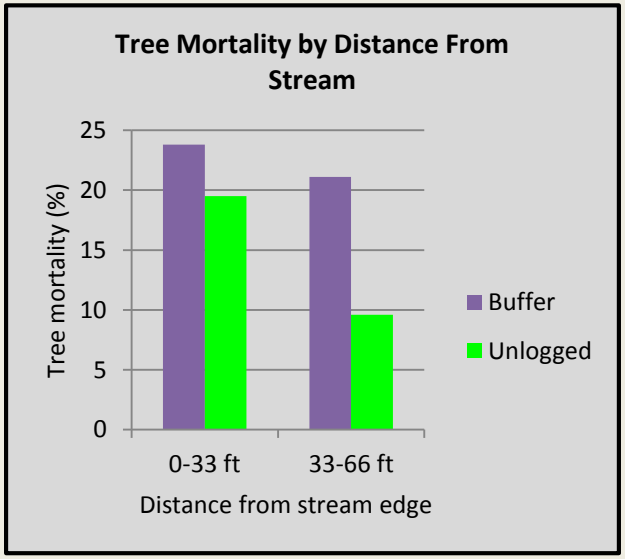
Large wood source distance findings are consistent among studies.

Windthrow and Future Long-term Supply of LWD





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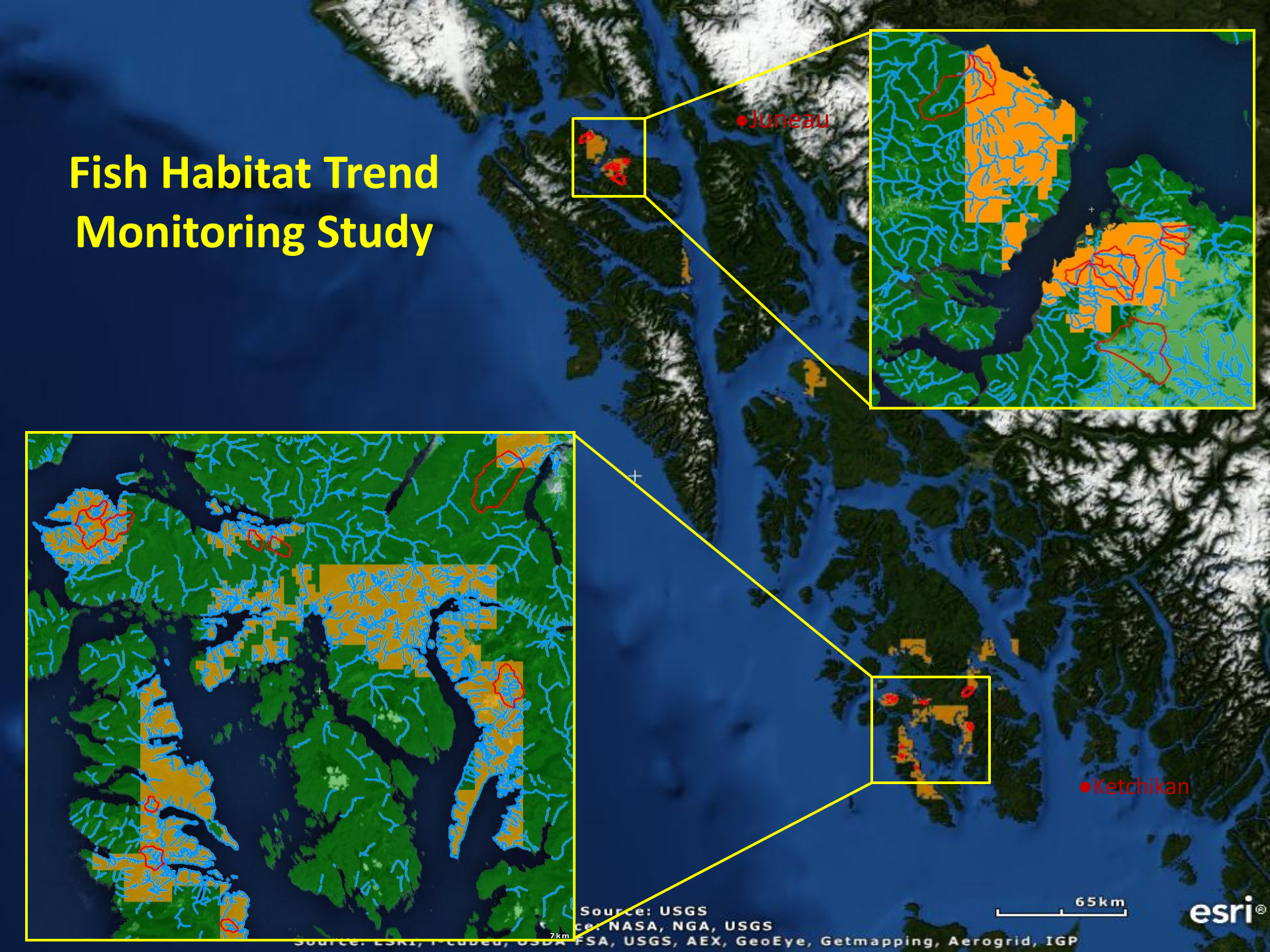
	100		90.0

Conclusion:
Windthrow has not significantly diminished the future potential supply of LWD.

Primary Goal of FRPA: Preservation of Fish Habitat

What is the effectiveness of FRPA buffer strips to protect and maintain anadromous fish habitat?

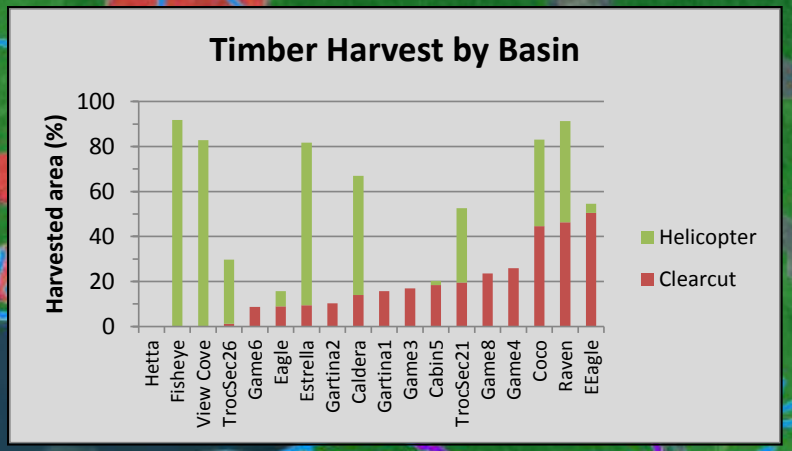
Fish Habitat Trend Monitoring Study

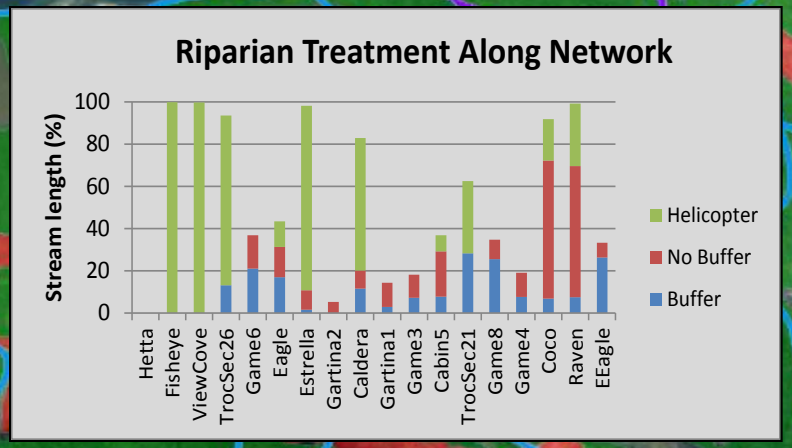


Trend Monitoring History

Stream	Harvest Year	Monitoring Schedule															
		94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
Cabin	1992	X	X		X						X	X	X					X
Eagle	1993	X	X	X	X						X	X	X	X	X	X	X	X
E. Eagle	1993	X	X	X	X						X	X	X		X	X	X	X
Game 6	1992	X	X	X	X	X						X	X					X
Game 4	1998	X	X	X	X	X					X	X	X					X
Raven	1999			X	X						X	X	X				X	X
Coco	2002	X	X	X	X						X	X	X	X	X	X	X	X
Caldera	2000		X	X	X						X	X	X					X
Game 3	2002	X	X	X	X	X					X	X	X					X
TroSec21	2007											X	X	X	X	X	X	X
TroSec26	2007											X	X	X	X	X	X	X
Gartina 2	2008										X	X	X	X	X	X	X	X
Fish Eye	2007											X	X	X	X			X
View Cove	2007											X	X	X	X			X
Estrella	---		X	X	X						X	X	X	X	X	X	X	X
Game 8	---				X							X	X	X	X	X	X	X
Gartina 1	---										X	X	X	X	X	X	X	X
Hetta	---											X	X	X	X			X
		Pre-harvest									Post-harvest							

Timber Harvest Intensity

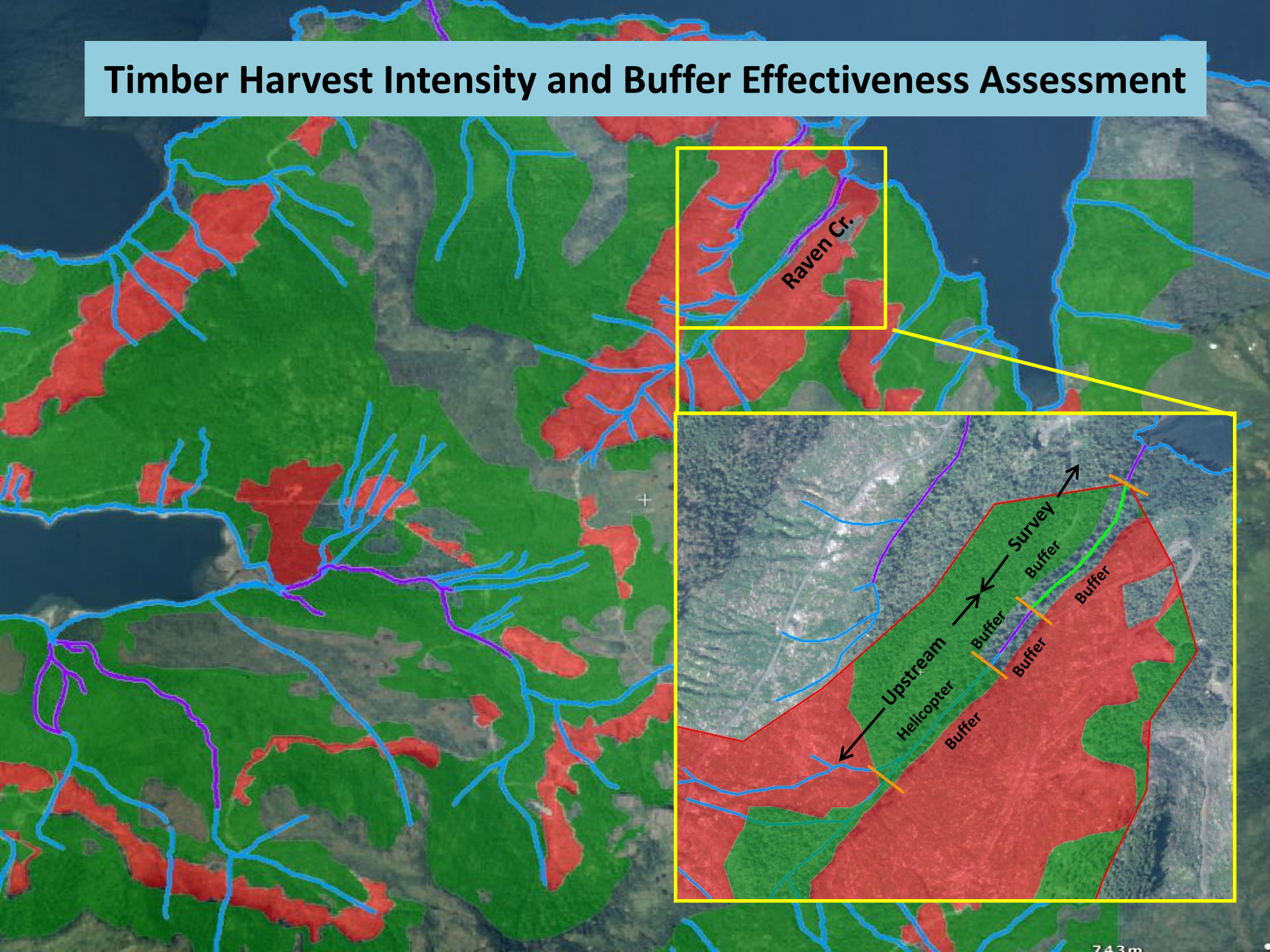




Raven Cr.

Caldera Cr.

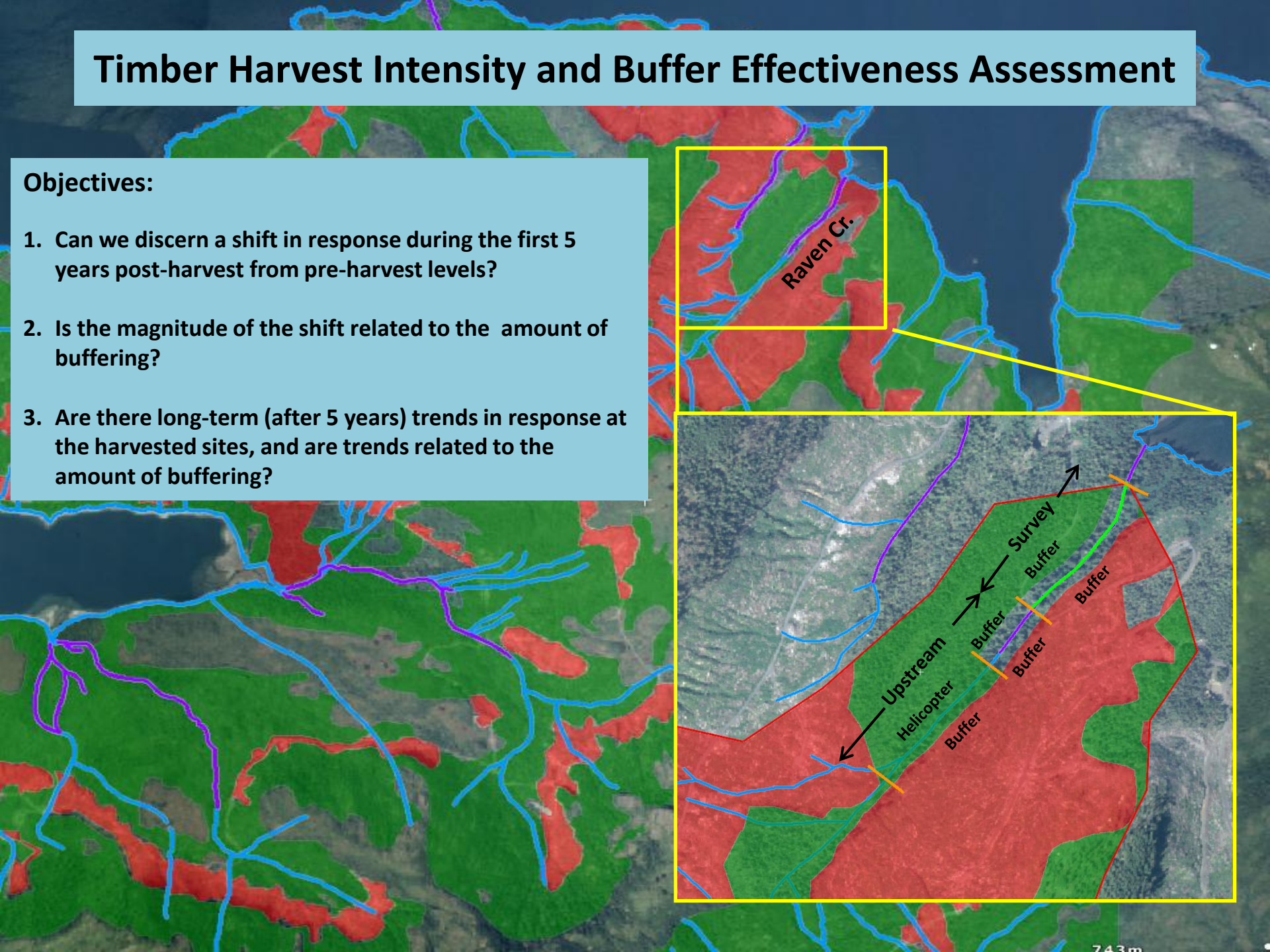
Timber Harvest Intensity and Buffer Effectiveness Assessment



Timber Harvest Intensity and Buffer Effectiveness Assessment

Objectives:

1. **Can we discern a shift in response during the first 5 years post-harvest from pre-harvest levels?**
2. **Is the magnitude of the shift related to the amount of buffering?**
3. **Are there long-term (after 5 years) trends in response at the harvested sites, and are trends related to the amount of buffering?**



Timber Harvest Intensity and Buffer Effectiveness Assessment

Objectives:

1. Can we discern a shift in response during the first 5 years post-harvest from pre-harvest levels?

2. Is the magnitude of the shift related to the amount of buffering?

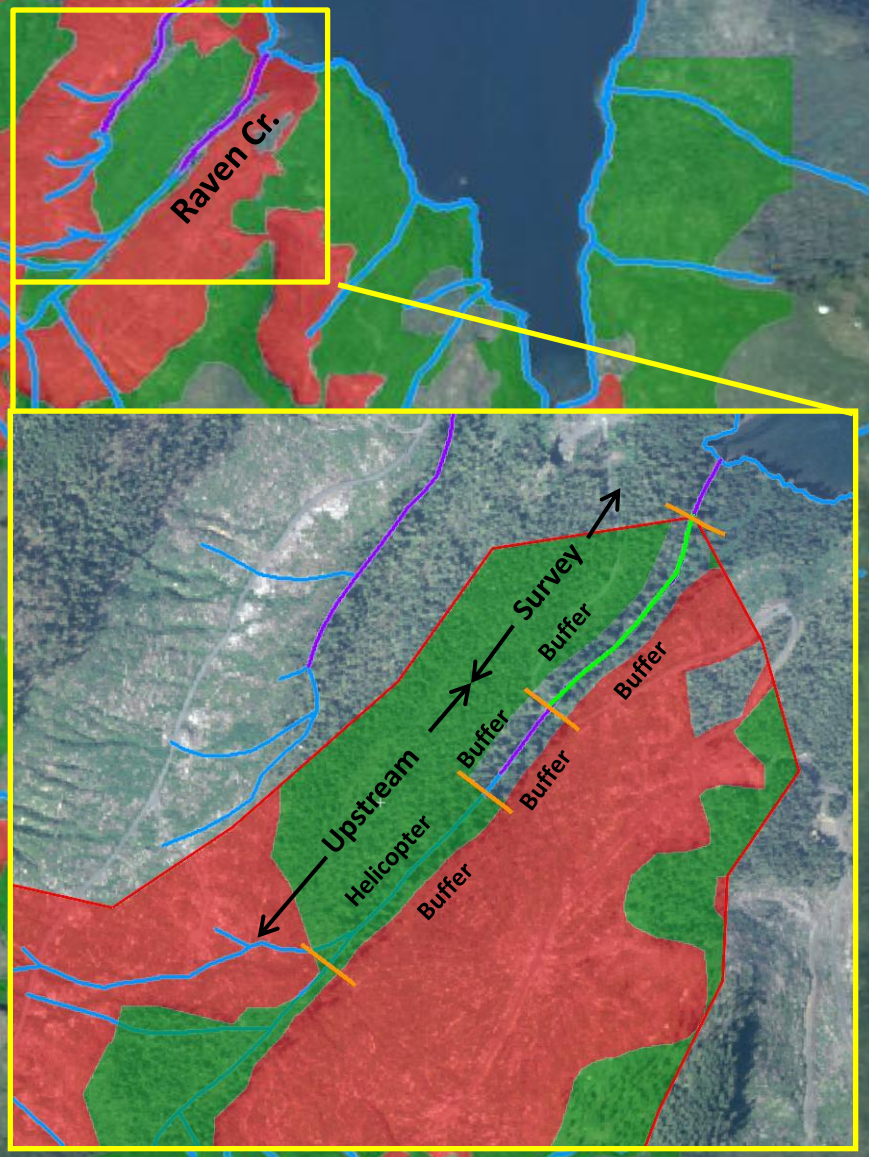
1. Are there long-term (after 5 years) trends in response at the harvested sites, and are trends related to the amount of buffering?

Key Findings:

1. There is a significant increase in large wood recruitment within a few years after harvest in streams with extensive buffer strips. No other significant responses were detected in the short-term.

2. Large wood loading is increasing over time following timber harvest, but long-term trend is not explainable by the amount of buffering.

3. We observe no distinct trends (+ or -) in key fish habitat characteristics following timber harvest during the 18 year monitoring period.



Conclusions

How Alaska's Forest Resources and Practices Act is Working to Protect Anadromous Fish Habitat?

What we know after 20 years of monitoring

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Conclusion:
Current streamside buffering on Sealaska lands is working to protect anadromous fish streams.

Acknowledgements

Funding:
Sealaska Corporation
Alaska Department of Natural Resources
Alaska Department of Environmental Conservation
Alaska Clean Water Action Program
USDA State and Private Forestry Grant
Contributors:
Reviews from state & federal agencies
FRPA Monitoring Committee
Alaska Forest Association

Energetic and hardworking field crews