

Arctic-Yukon-Kuskokwim Region 2013 Escapement Goal Review and Recommendations



Summary Report to the 2013 AYK Meeting
of the Alaska Board of Fisheries
Written Report RC 3, Tab 1
Oral Report RC 7, Tab 1

Escapement Goal Recommendations

- Selected salmon stocks.
- Based upon Sustainable Salmon (5 AAC 39.222) and Escapement Goal (5 AAC 39.223) policies.
- Detailed analyses in separate report for Kuskokwim Chinook salmon.
- Approval following Board of Fisheries meeting by directors of Commercial Fisheries and Sport Fish divisions.



Escapement Goal Review Process

- Formal process began May 2011.
- ADF&G review team: research coordinators and fisheries scientists from CF and SF divisions.
- Outreach: federal agency staff, Tribal agencies, CDQ groups, Kuskokwim Working Group, others.
- 2 large meetings with stakeholders:
 - November, 14-15 2011
 - March 1-2, 2012
- Follow up: email, phone, distribution/review of meeting notes.
- Additional smaller meetings: summer and fall 2012.

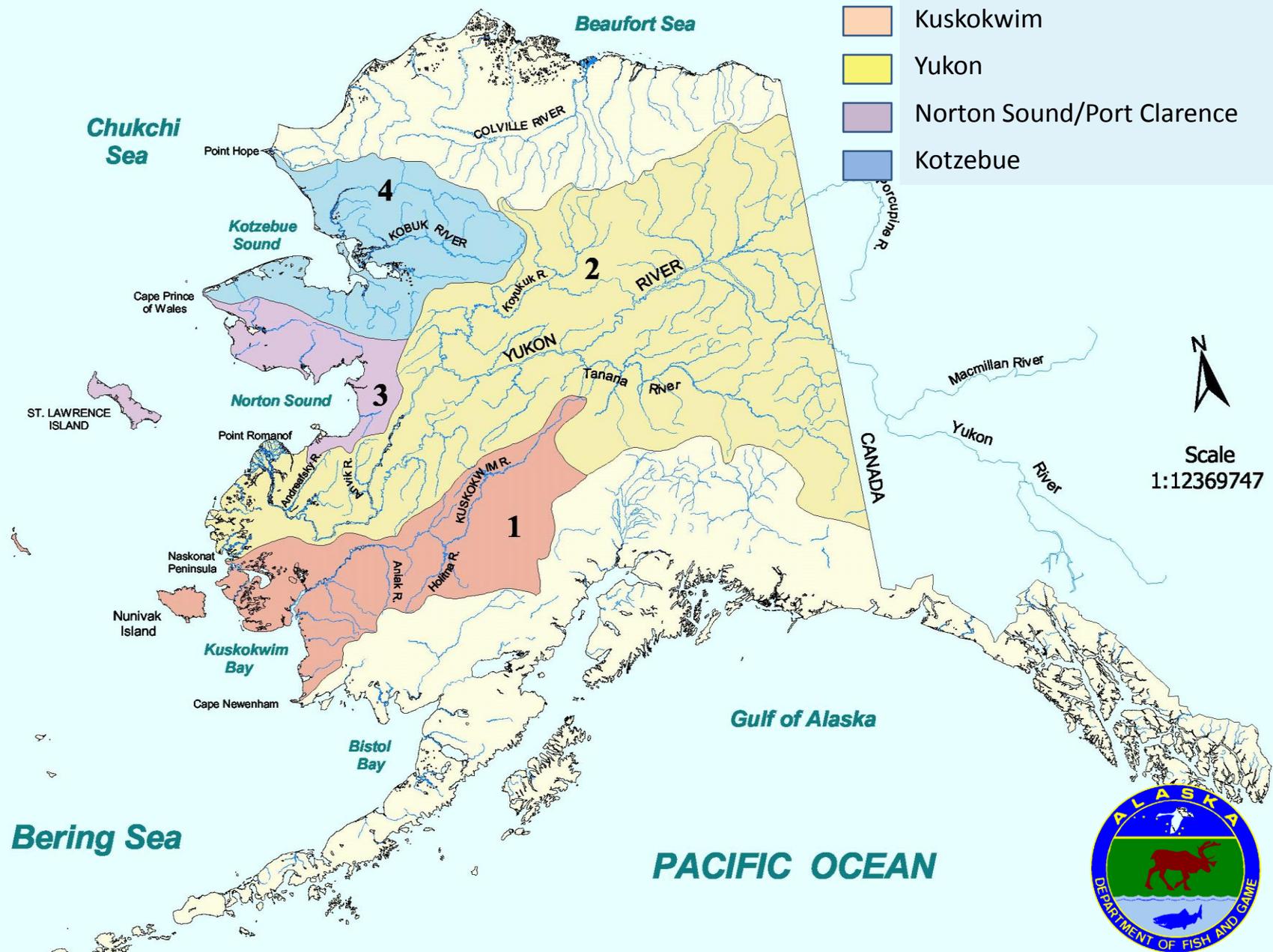


Information and Criteria

- Previous review (2010 cycle) and existing goals.
- Data series updates - through 2011.
- Fishery performance and management needs:
 - New/developing fisheries.
 - Management uncertainty.
- Stock assessment data: changes, trends, new projects or methods:
 - Time-series length and continuity.
 - Contrast – years of high and low abundance.
 - Data and information quality.

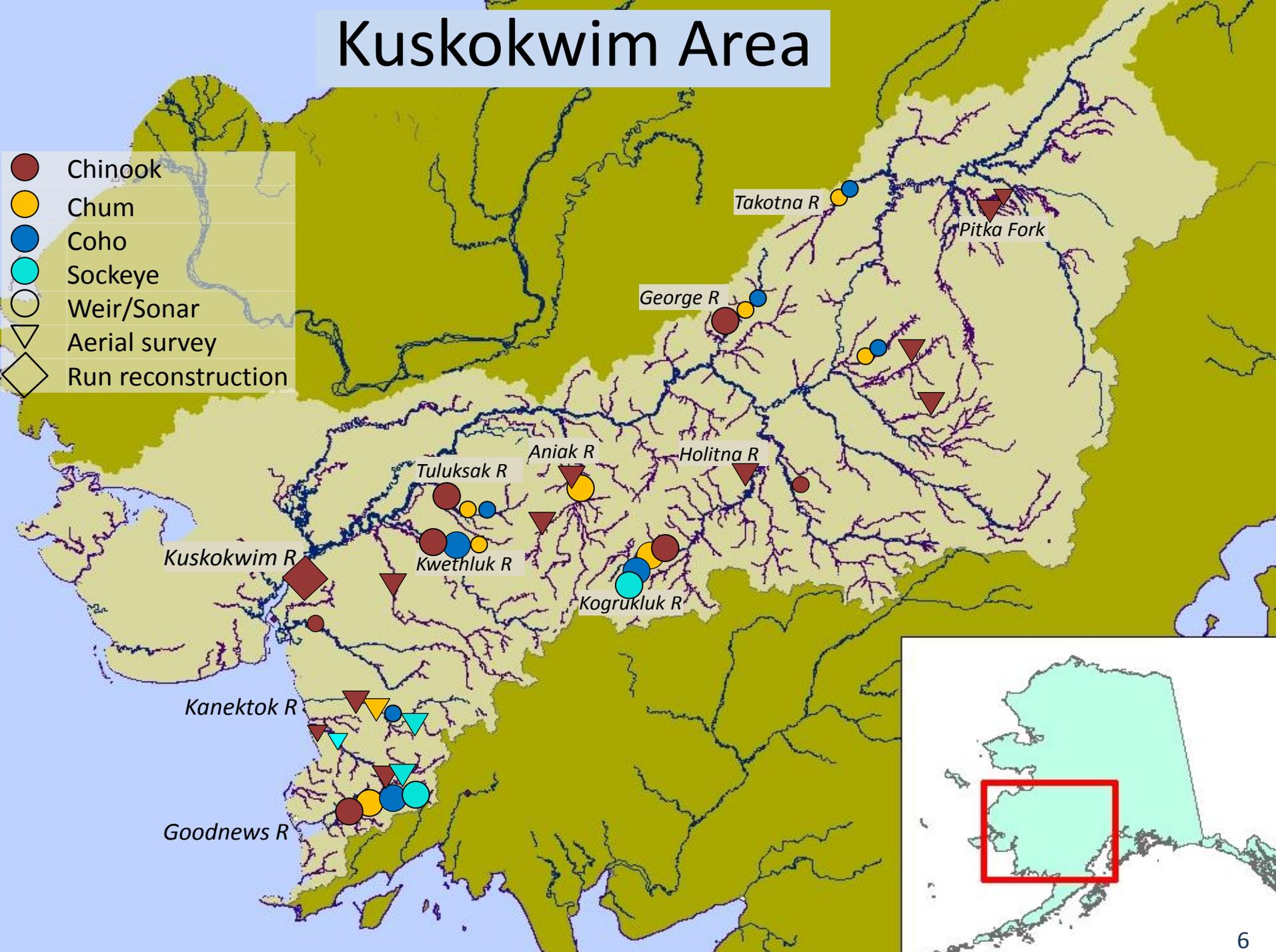


AYK Region Management Areas



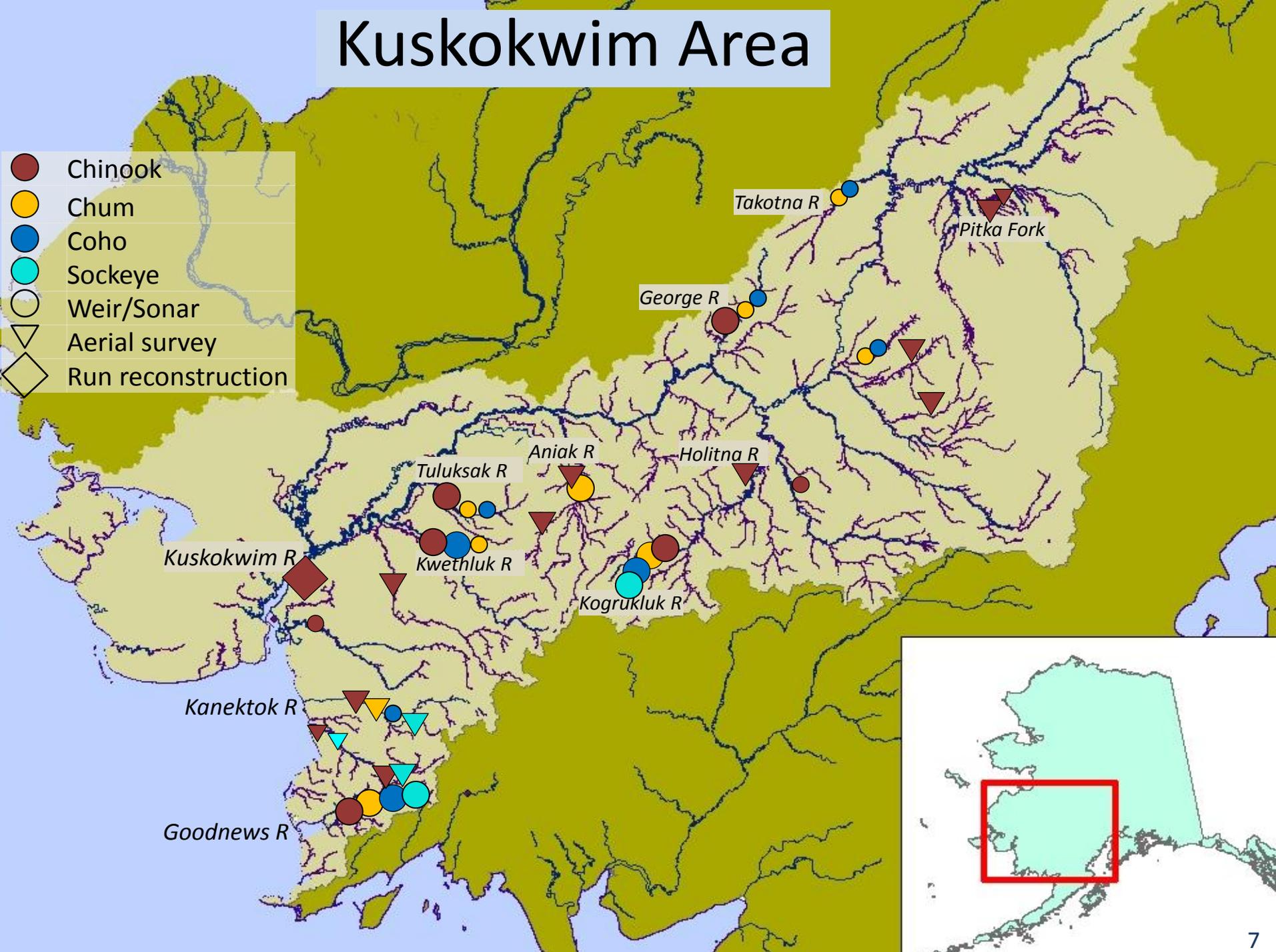
Kuskokwim Area

- Chinook
- Chum
- Coho
- Sockeye
- Weir/Sonar
- Aerial survey
- Run reconstruction



Kuskokwim Area

- Chinook
- Chum
- Coho
- Sockeye
- Weir/Sonar
- Aerial survey
- Run reconstruction



Kuskokwim River Chinook Goals

- A drainagewide goal is needed for better management.
- There has been no drainagewide goal to date.
- New information, methods are available for run reconstruction and spawner-recruit analysis.
- Recommended goal is SEG.
- Revisions to tributary goals are needed for consistency with drainagewide goal.



Kuskokwim Area Recommendations

- | | | | |
|-----------|-----------------------------------|-----------------------------|-----------|
| • Chinook | Kuskokwim R | drainagewide reconstruction | Establish |
| • Chinook | Kwethluk R | weir | Revise |
| • Chinook | George R | weir | Revise |
| • Chinook | Kogruklu R | weir | Revise |
| • Chinook | Tuluksak R | weir | Eliminate |
| • Chum | Kanektok River
(Kuskokwim Bay) | aerial survey | Eliminate |

- All others – no change



Yukon Area



Yukon Area



Yukon Area Recommendations

- No changes to existing goals.*

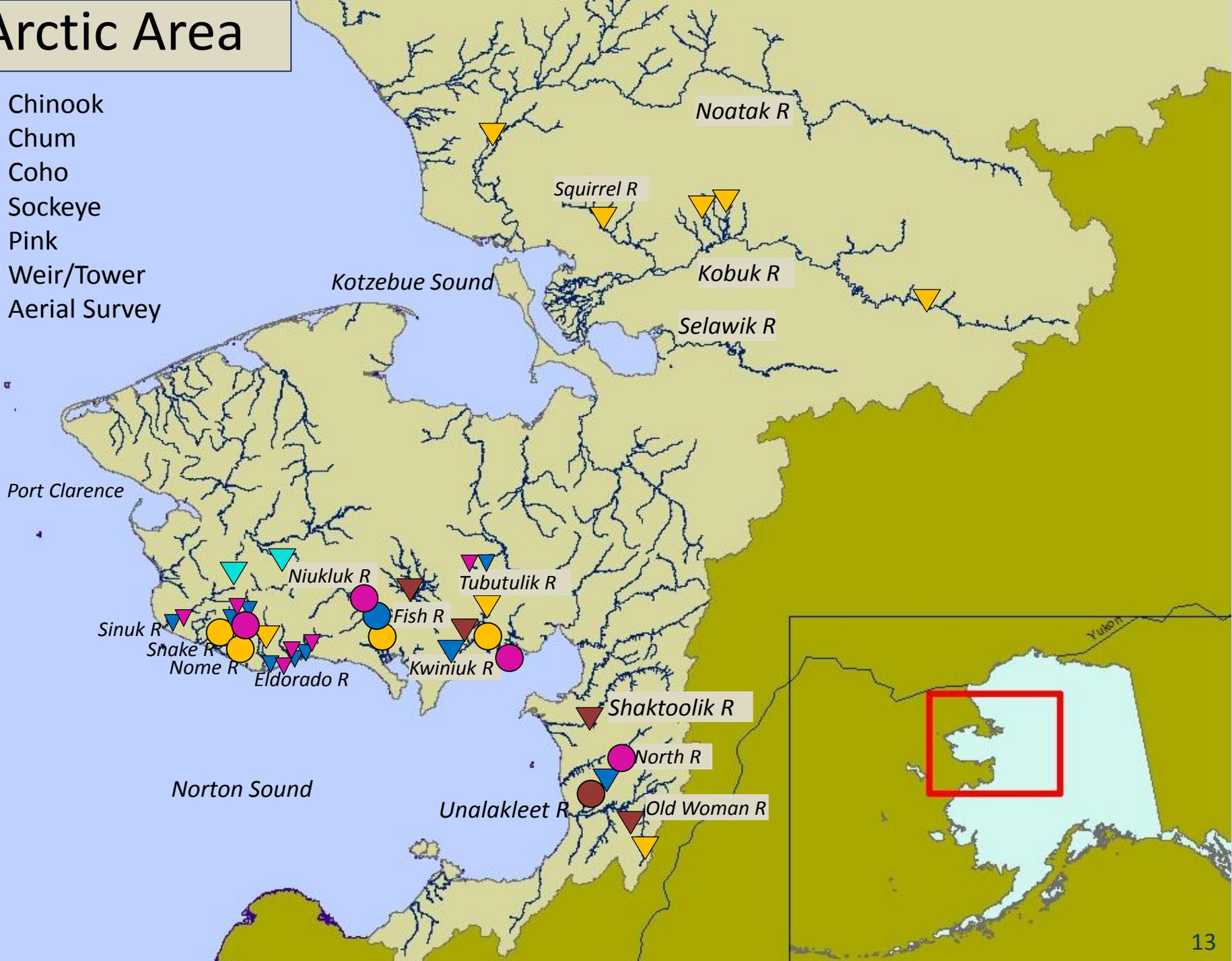
* “No change” recommended if:

- Goal performing as intended for management;
- Fishery and assessment have not changed; and
- Change in goal very small when recalculated using most current data.



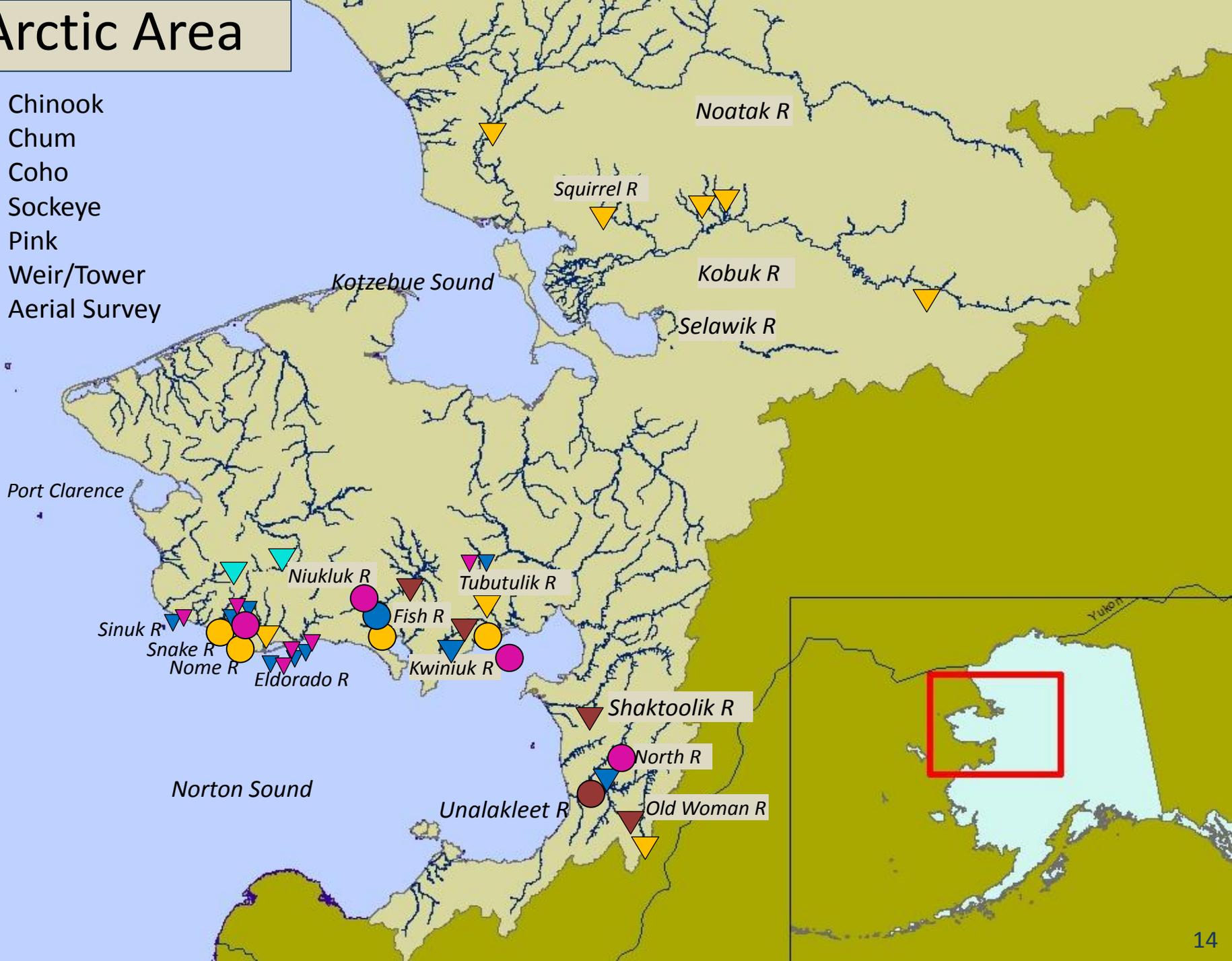
Arctic Area

- Chinook
- Chum
- Coho
- Sockeye
- Pink
- Weir/Tower
- ▽ Aerial Survey



Arctic Area

- Chinook
- Chum
- Coho
- Sockeye
- Pink
- Weir/Tower
- ▽ Aerial Survey



Norton Sound-Port Clarence and Kotzebue Area Recommendations

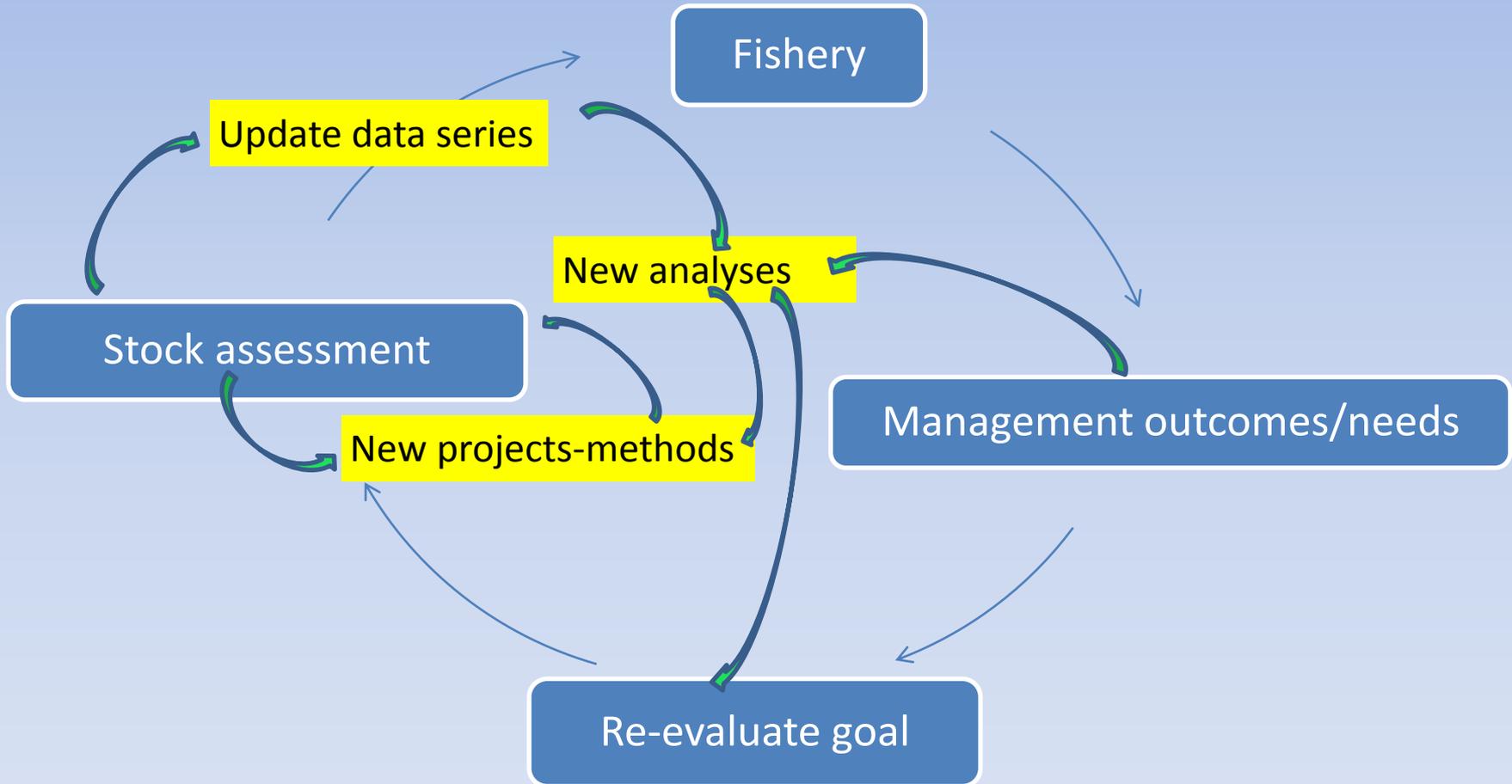
• Chinook Shaktoolik R aerial survey Eliminate

• All others No change*

*Performing as intended;
*No major change, fisheries or assessments; and
*Most recent data does not substantially change goal.

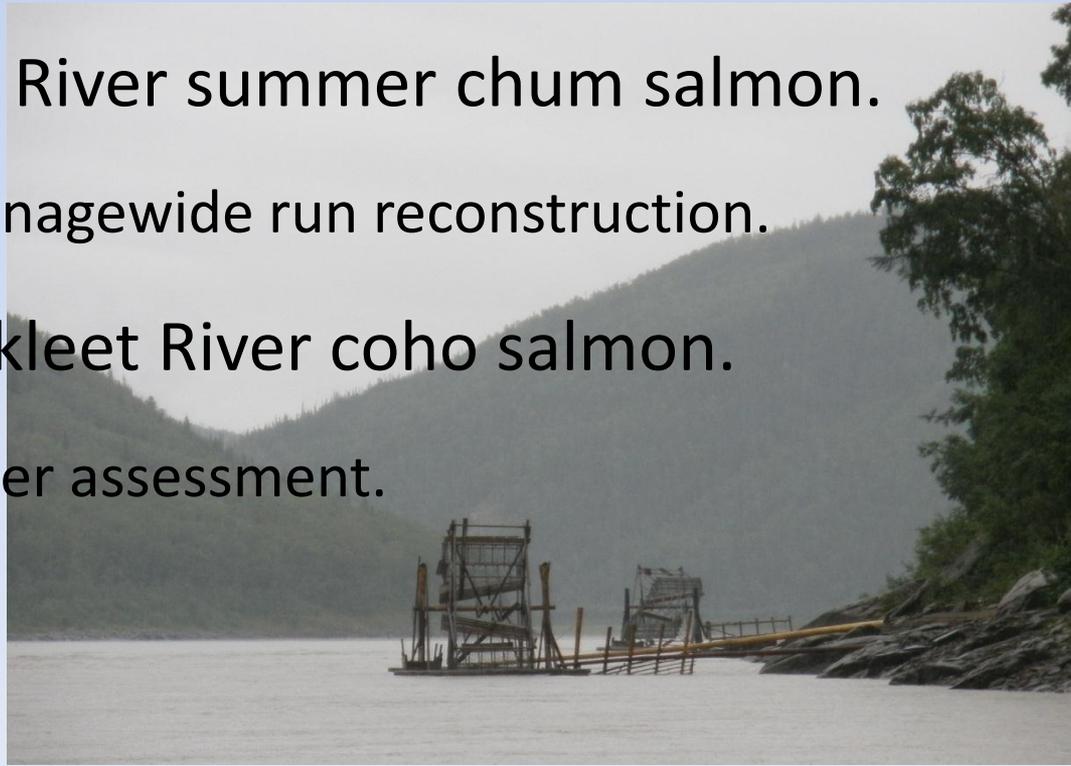


Escapement Goal Evaluation is Ongoing



In Conclusion

- Overall, very few changes recommended this cycle.
- Follow-up on two goals in next board cycle:
 - Yukon River summer chum salmon.
 - drainagewide run reconstruction.
 - Unalakleet River coho salmon.
 - tower assessment.



Kuskokwim River King Salmon Run Reconstruction and Escapement Goal Development



Alaska Board of Fisheries
January 2013

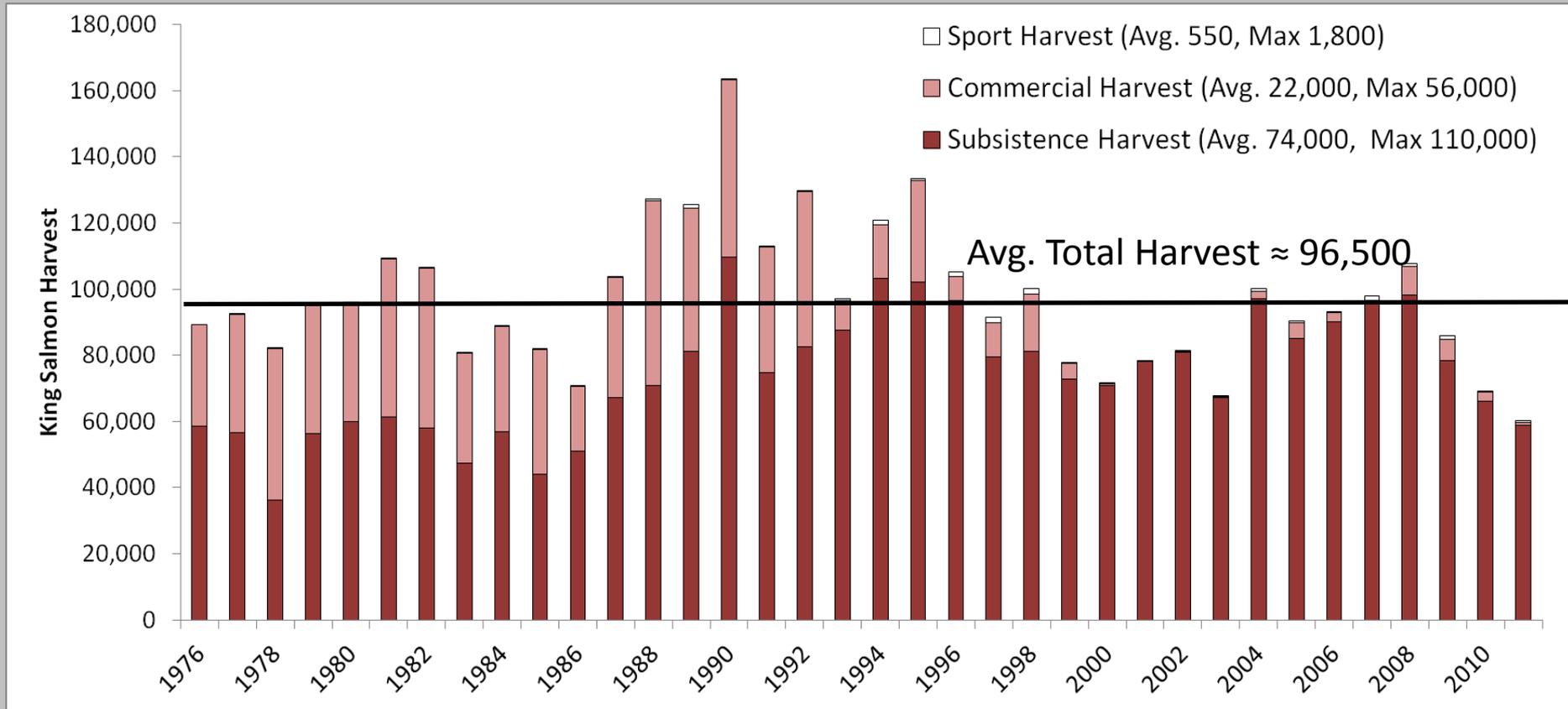
Zachary W. Liller
Toshihide "Hamachan" Hamazaki

Written Report RC 3, Tab 2
Oral Report RC 7, Tab 2



Kuskokwim River King Salmon

Historical Harvest



- Primarily a subsistence fishery.
- 0–50,000 guideline commercial harvest.
- Modest sport harvest.

Kuskokwim River King Salmon

Primary Harvest Locations

Subsistence and commercial harvests occurs in the mainstem Kuskokwim River and majority occurs in the lower portion of the river.

District W1
Commercial

Bethel

Average Percent Subsistence Harvest by Community



0 50 100 200 Kilometers

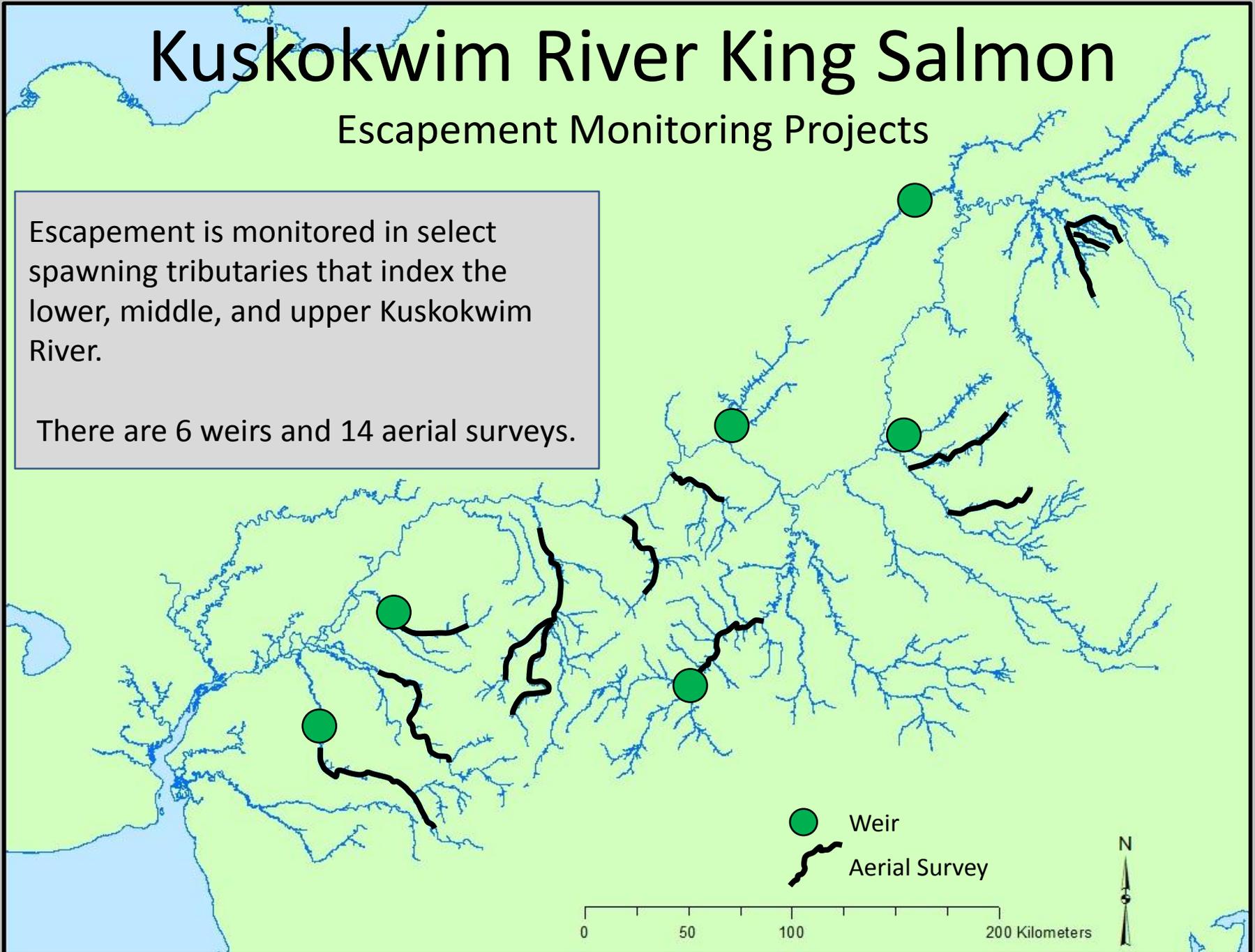


Kuskokwim River King Salmon

Escapement Monitoring Projects

Escapement is monitored in select spawning tributaries that index the lower, middle, and upper Kuskokwim River.

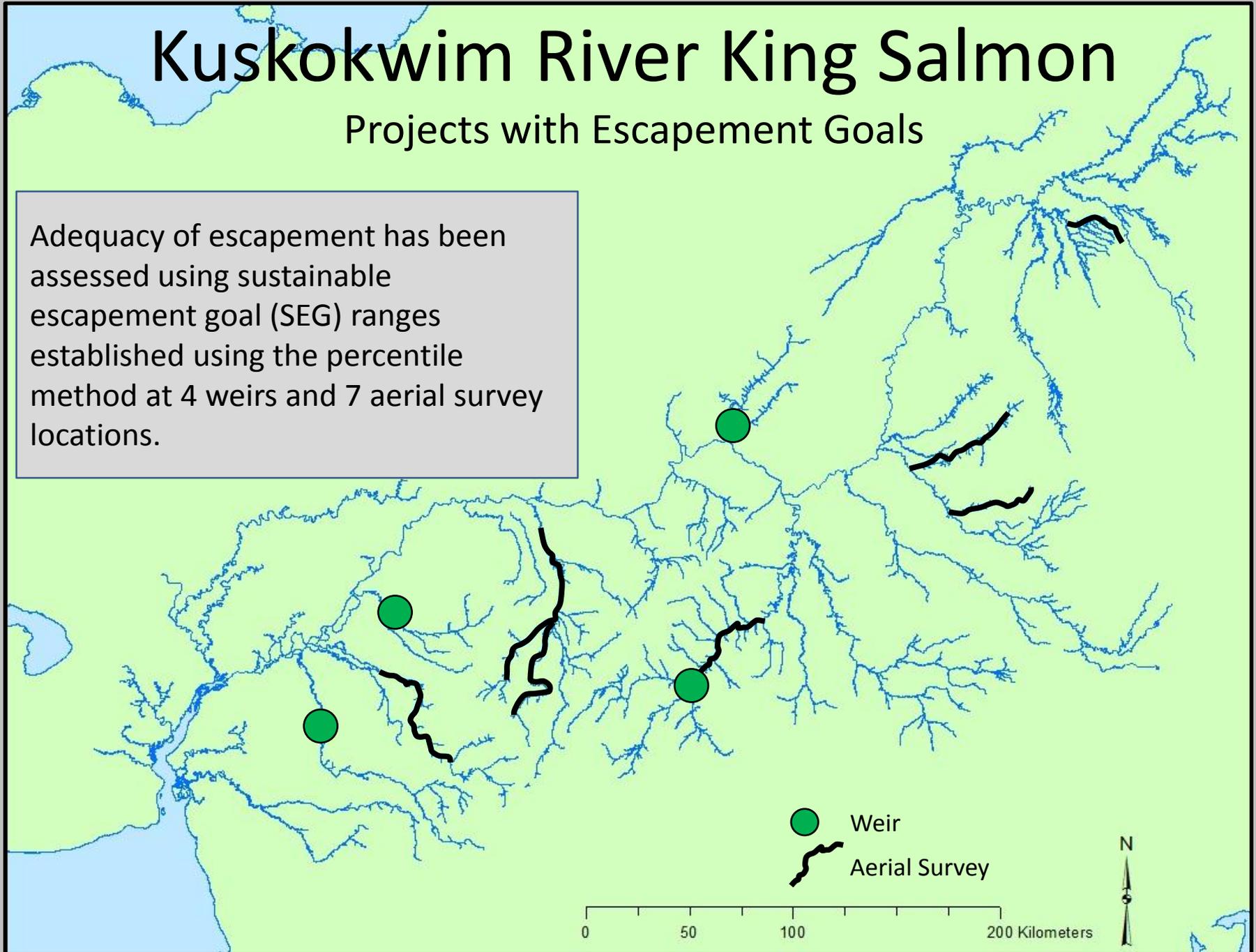
There are 6 weirs and 14 aerial surveys.



Kuskokwim River King Salmon

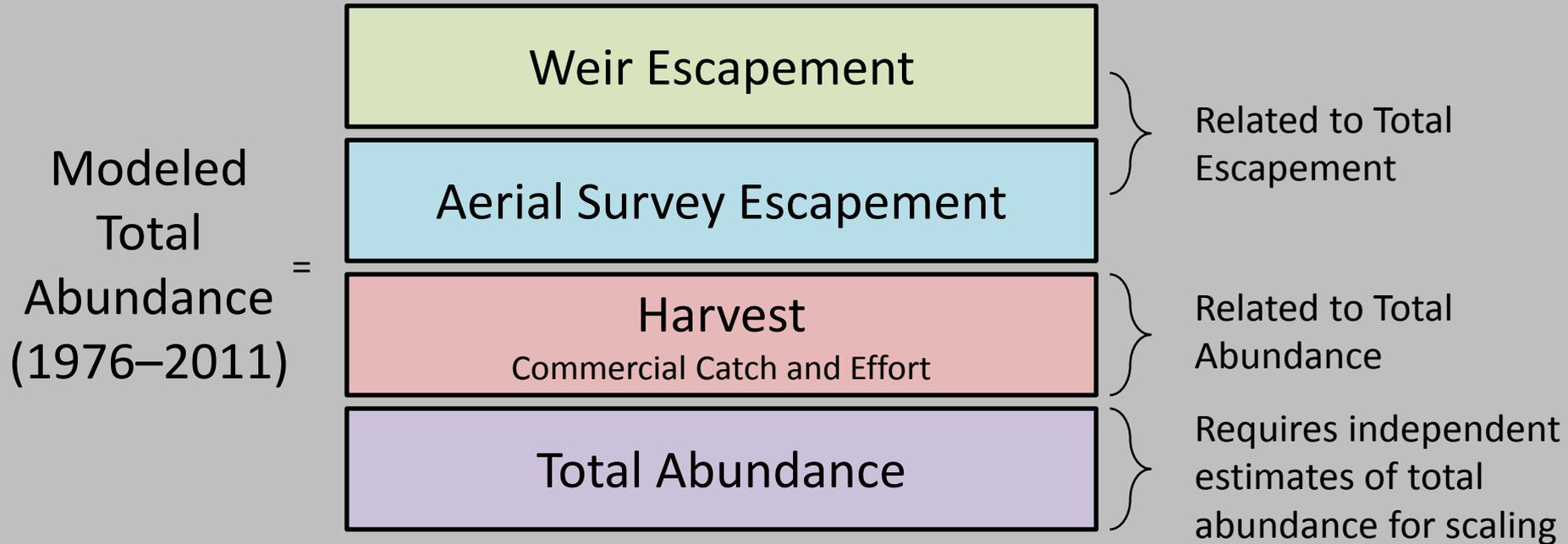
Projects with Escapement Goals

Adequacy of escapement has been assessed using sustainable escapement goal (SEG) ranges established using the percentile method at 4 weirs and 7 aerial survey locations.



Run Reconstruction

Model Framework



Maximum likelihood model simultaneously considers all available abundance information from 6 weirs, 14 aerial survey locations, harvest, and run-timing to arrive at an objective and quantitative estimate of total return for each year, 1976–2011.

Run Reconstruction

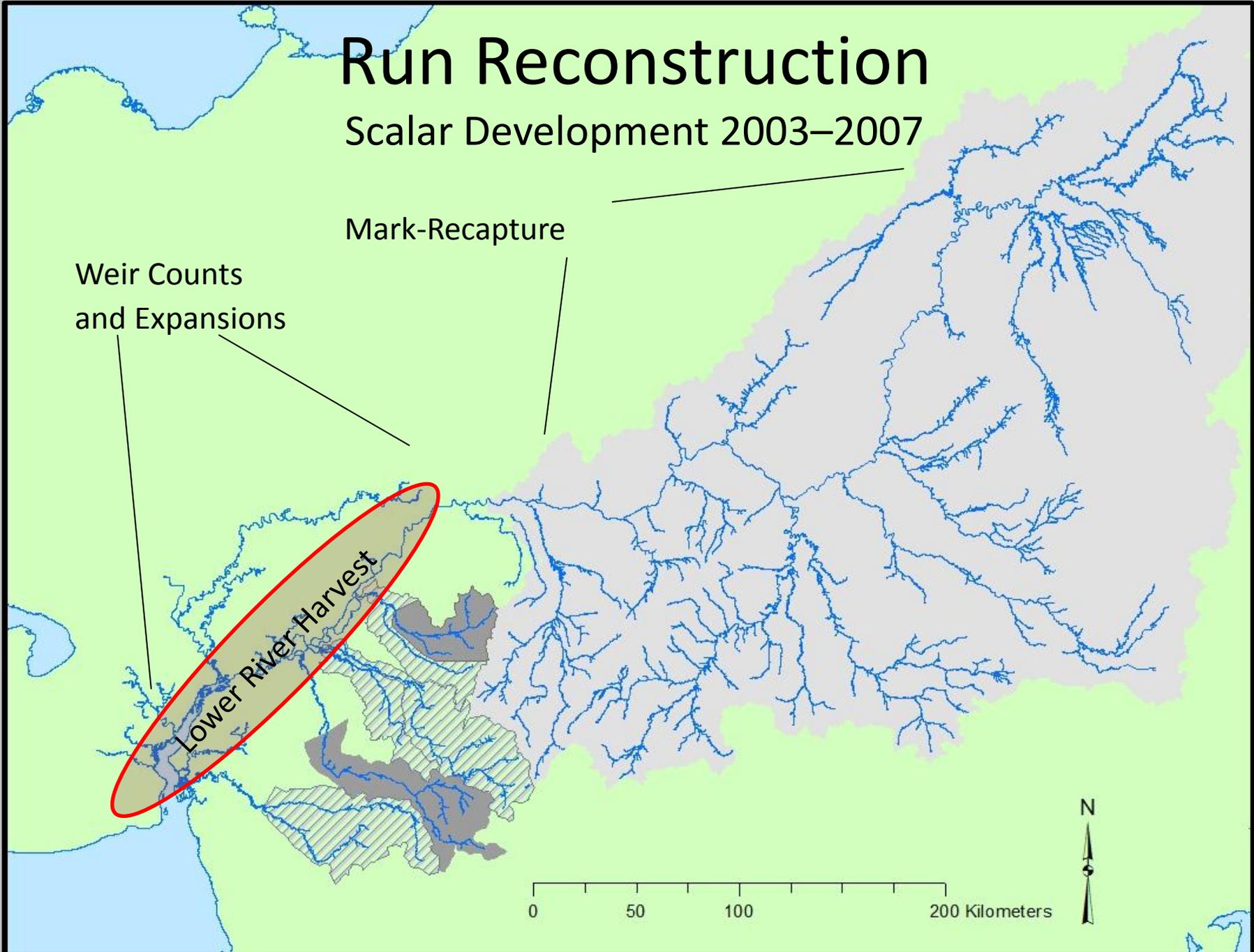
Scalar Development 2003–2007

Mark-Recapture

Weir Counts
and Expansions

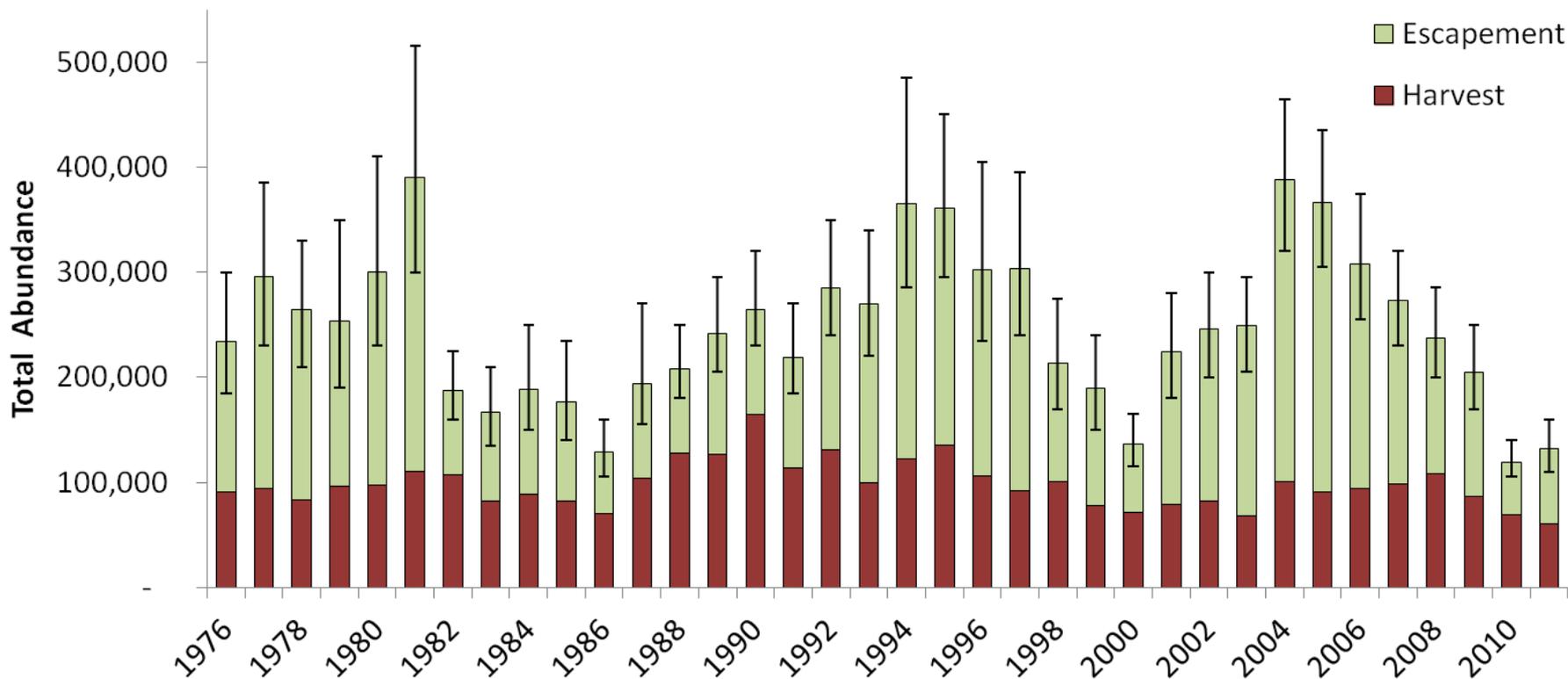
Lower River Harvest

0 50 100 200 Kilometers



Run Reconstruction

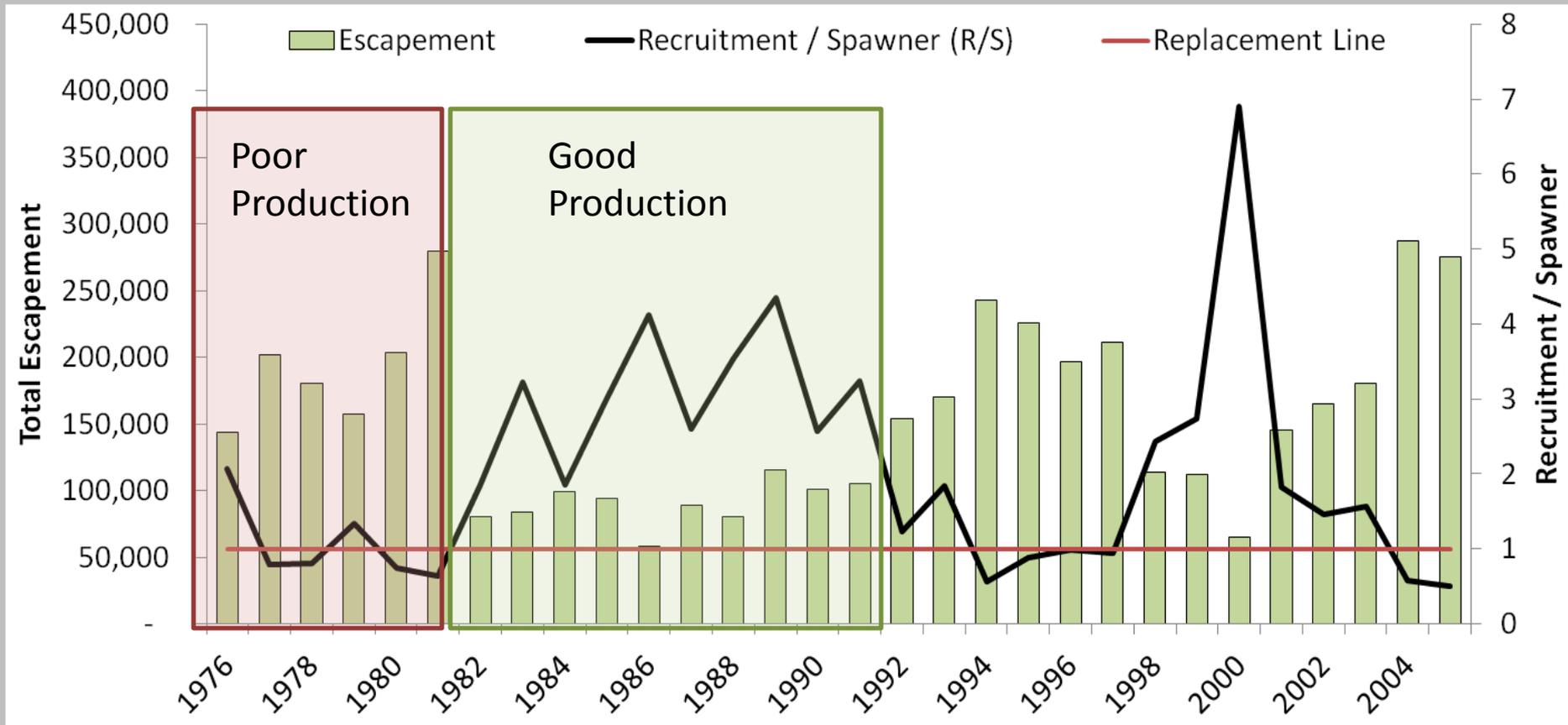
Total Annual Run Abundance



- Abundance is cyclic (highs and lows).
- Currently in a period of low returns.
- Harvest is relatively stable and weakly correlated to total abundance.
- Escapement is highly variable and strongly correlated to total abundance.

Run Reconstruction

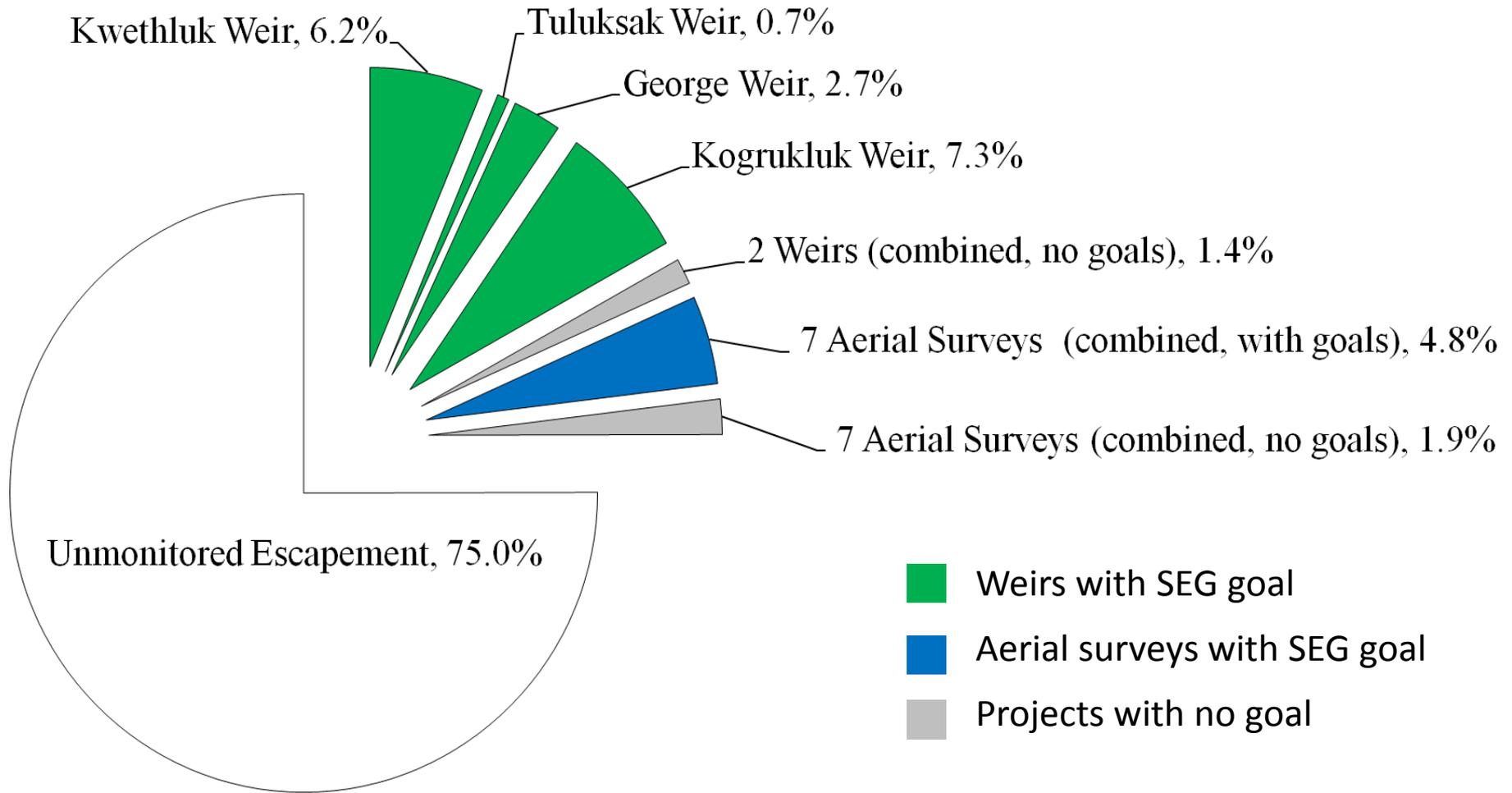
Escapement and Recruitment



- Very large escapements often did not replace themselves.
- Relatively small escapements were productive.

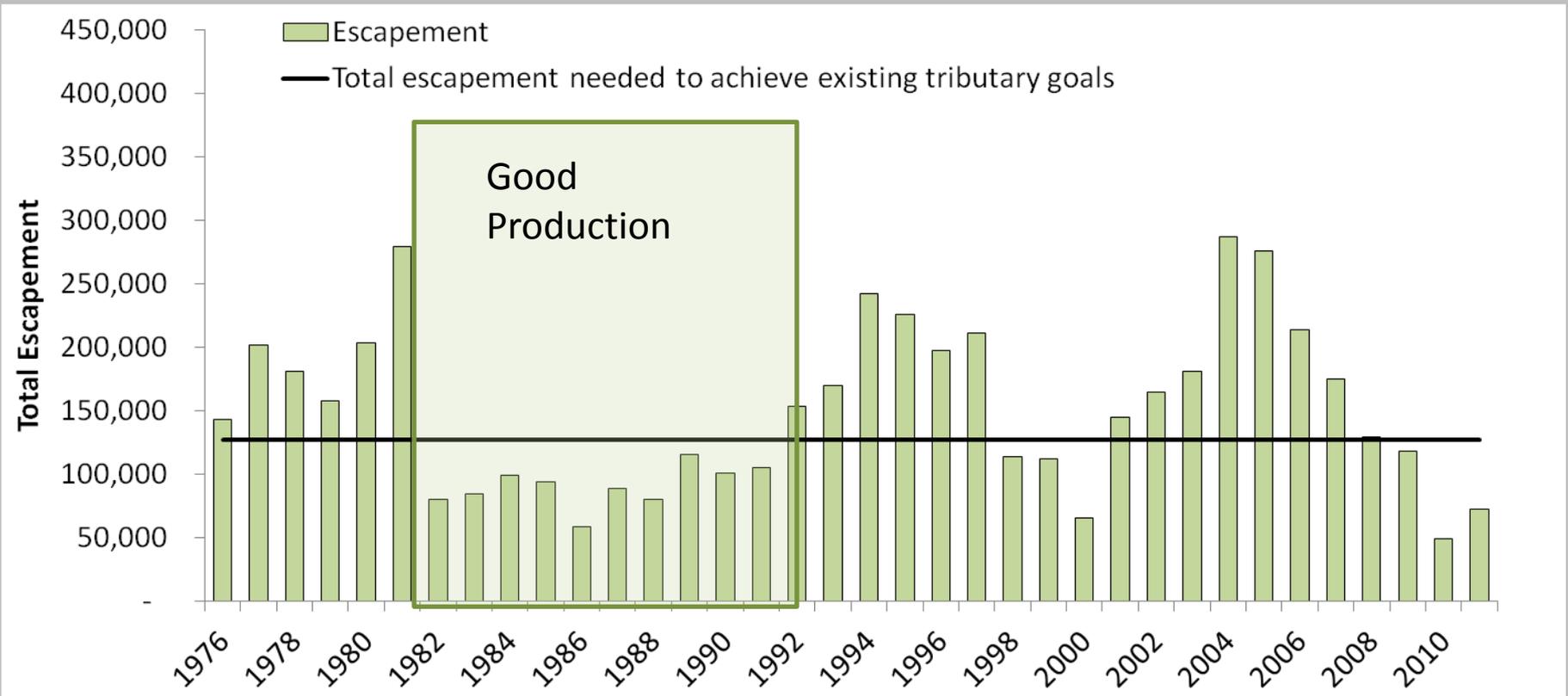
Run Reconstruction

Percent of Total Escapement Monitored



Run Reconstruction

Context for Existing Tributary Goals



- If existing goals were appropriate, escapements <127,000 would be bad.
- Escapements <127,000 resulted in large recruitment and adequate yield.
- Existing SEG goals are overly conservative .

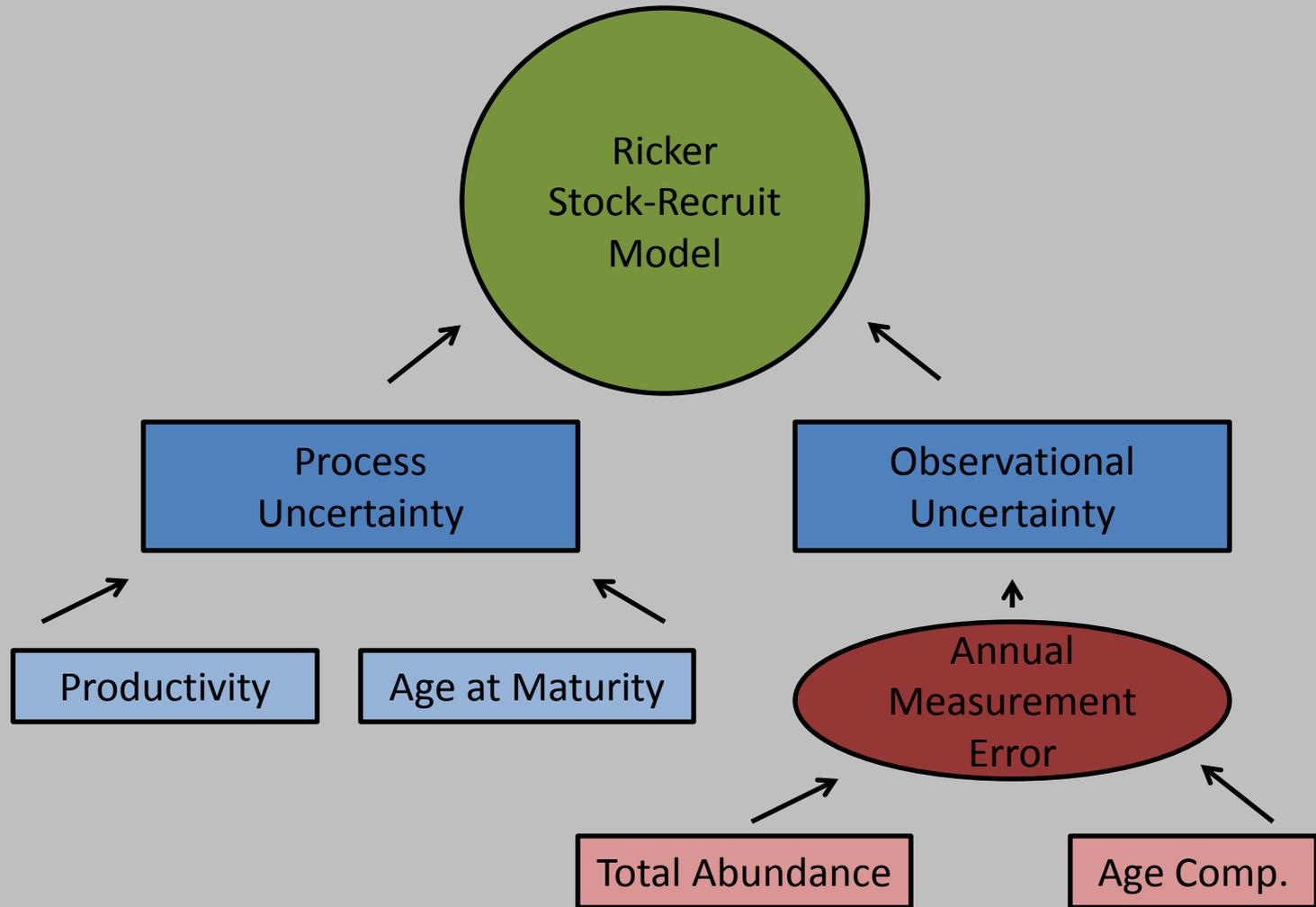
Escapement Goal Review

Objective

- 1) Describe the productivity and capacity of the Kuskokwim River king salmon stock, as quantified from stock-recruit analyses.

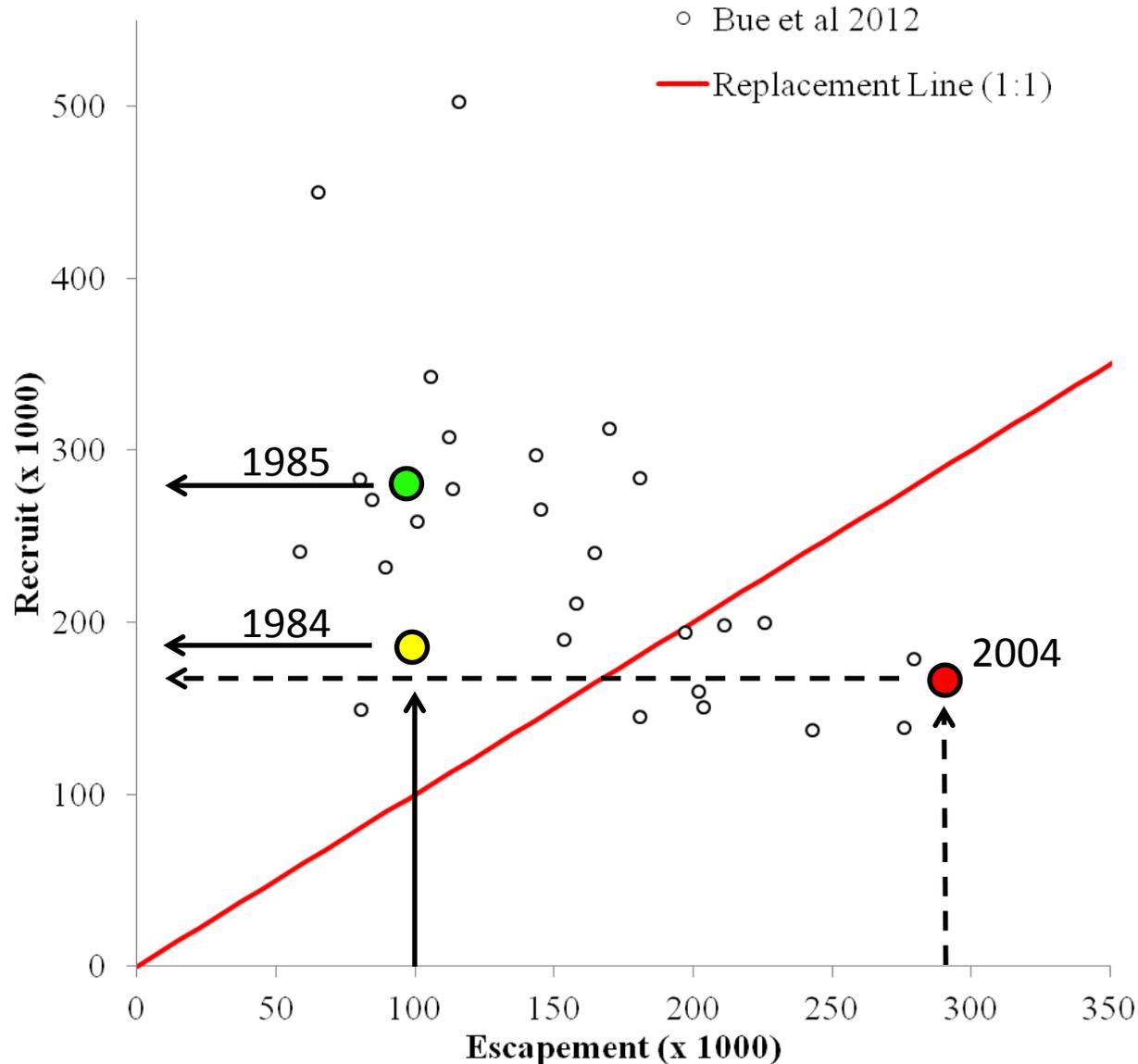
Spawner-Recruit Analysis

Bayesian State - Space Model Framework



Spawner-Recruit Analysis

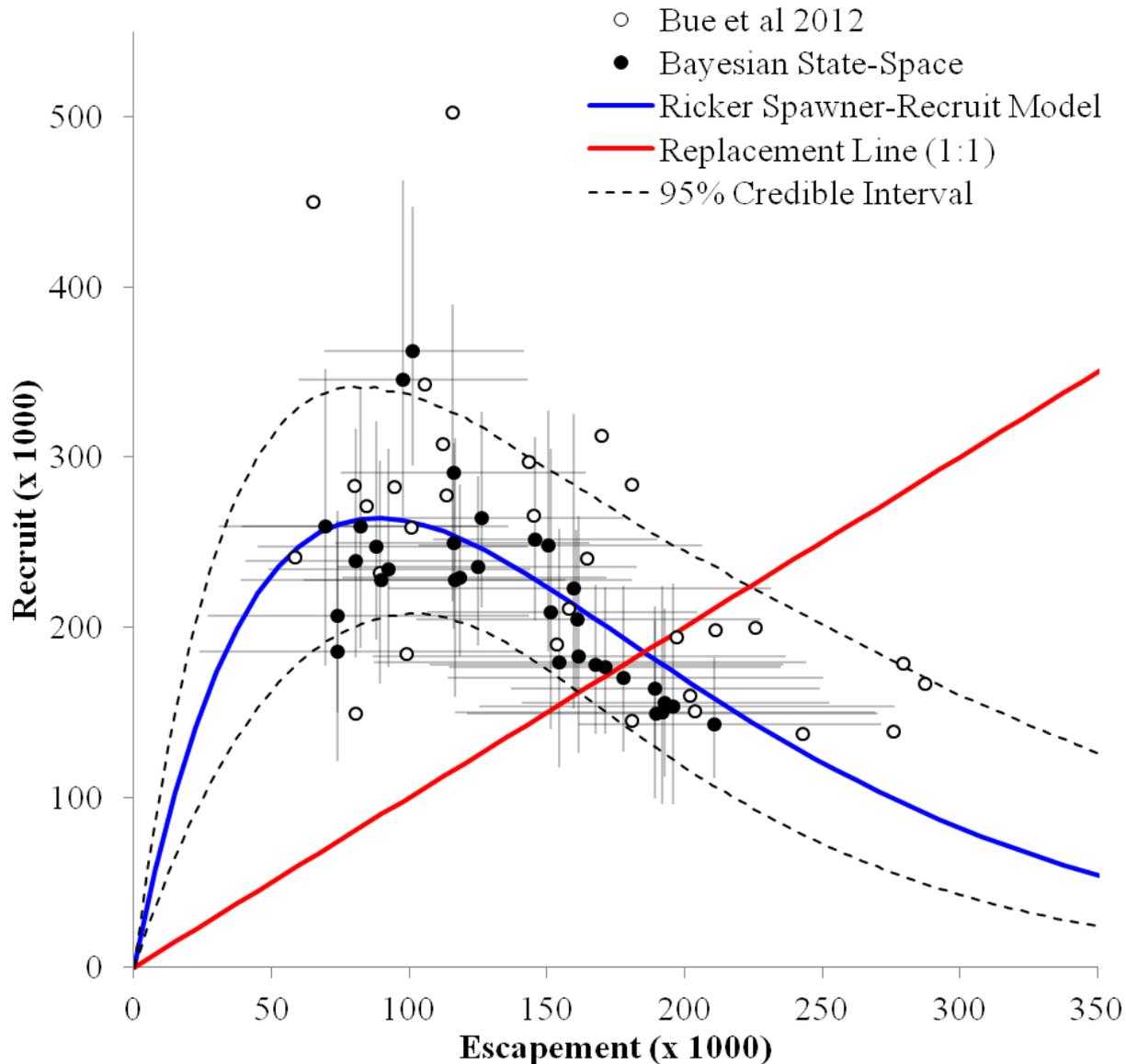
Results



32 years of spawner-recruit data shows the relationship between escapement and number of fish produced.

Spawner-Recruit Analysis

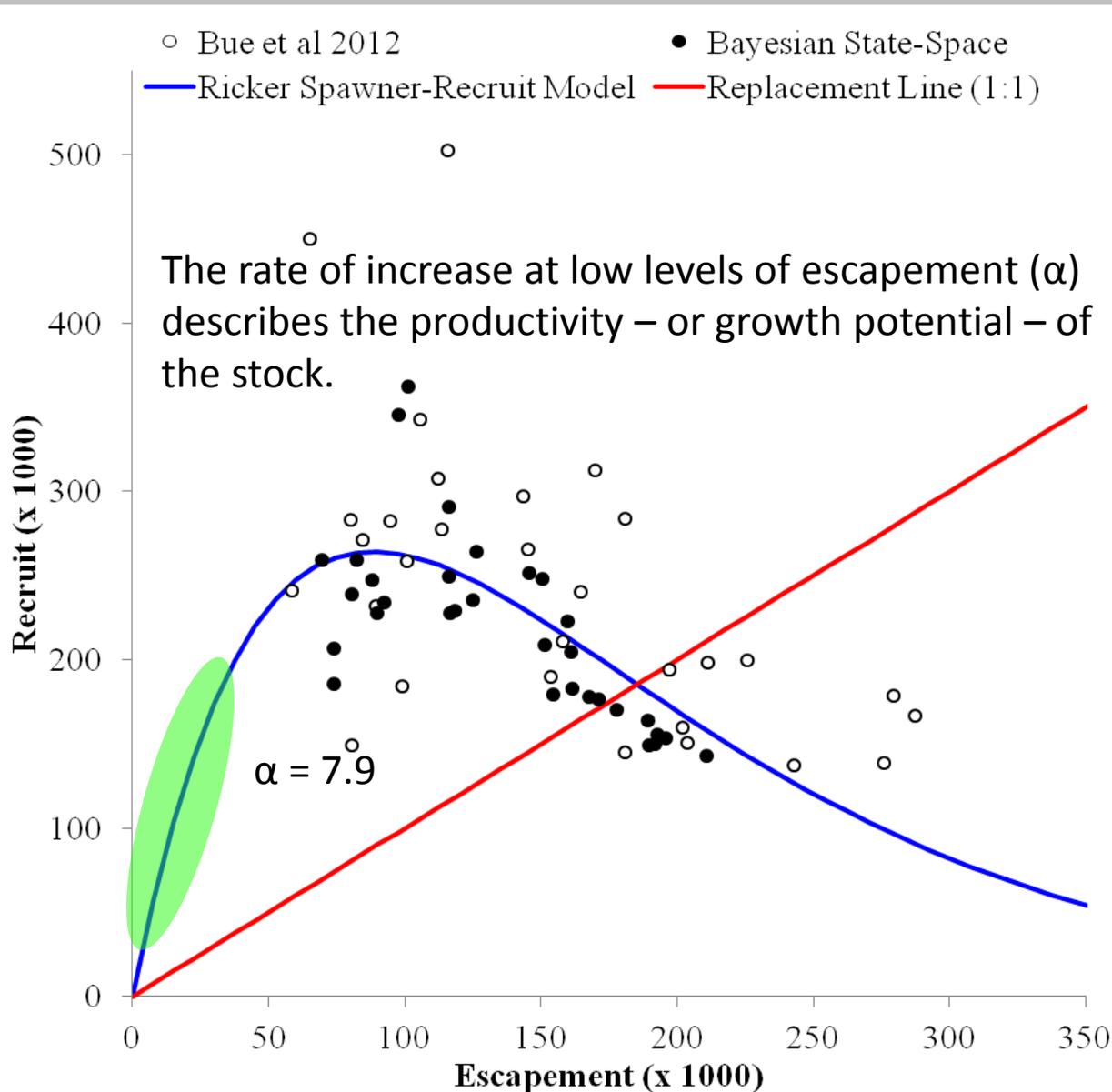
Results



32 years of spawner-recruit data, modeled to account for uncertainty and fit a Ricker spawner-recruit relationship.

Spawner-Recruit Analysis

Results: Productivity

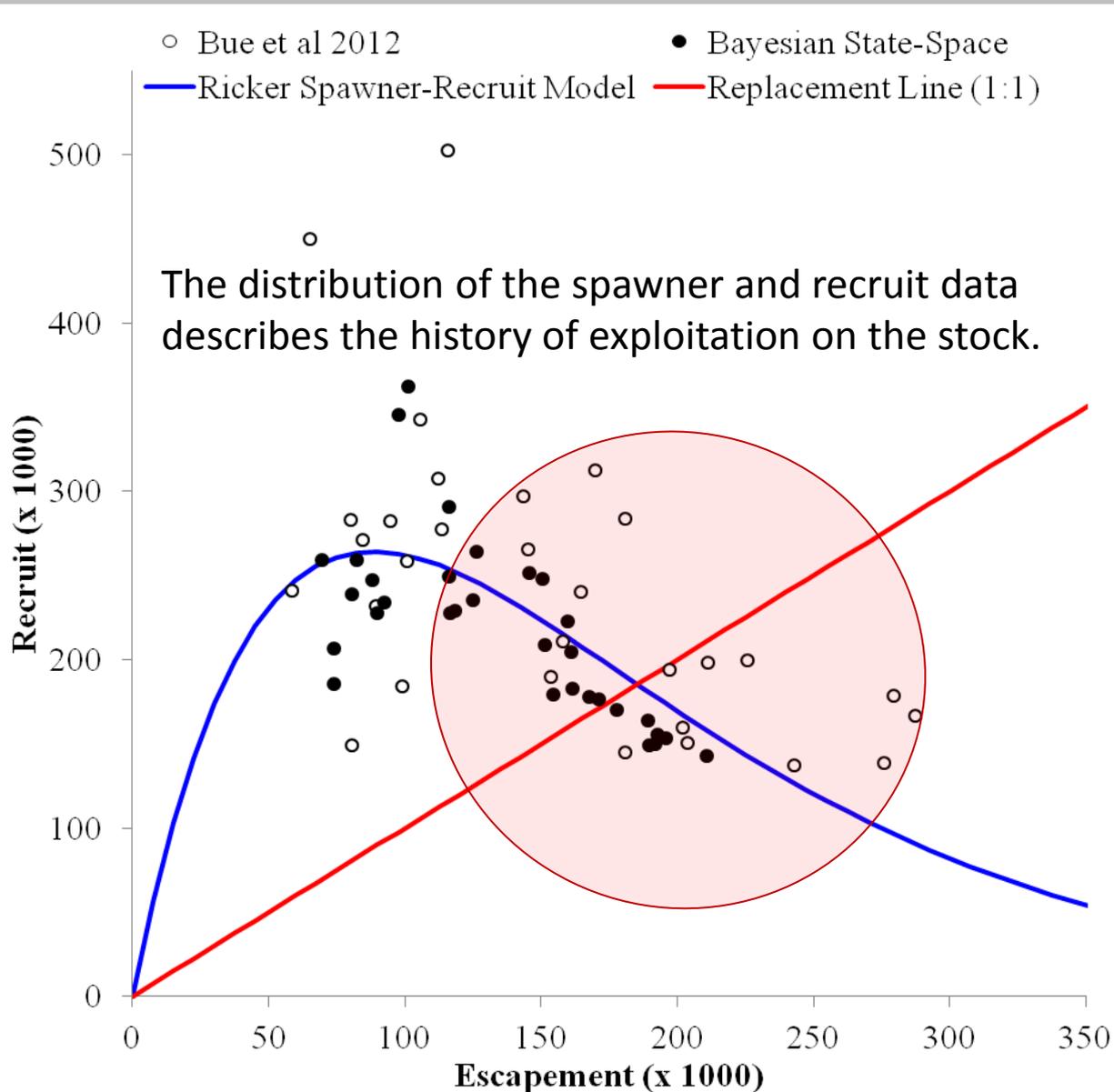


Conclusion:

Kuskokwim River
King salmon
population is
highly productive.

Spawner-Recruit Analysis

Results: Harvest



Conclusion:

Kuskokwim River king salmon population does not show signs of overharvest.

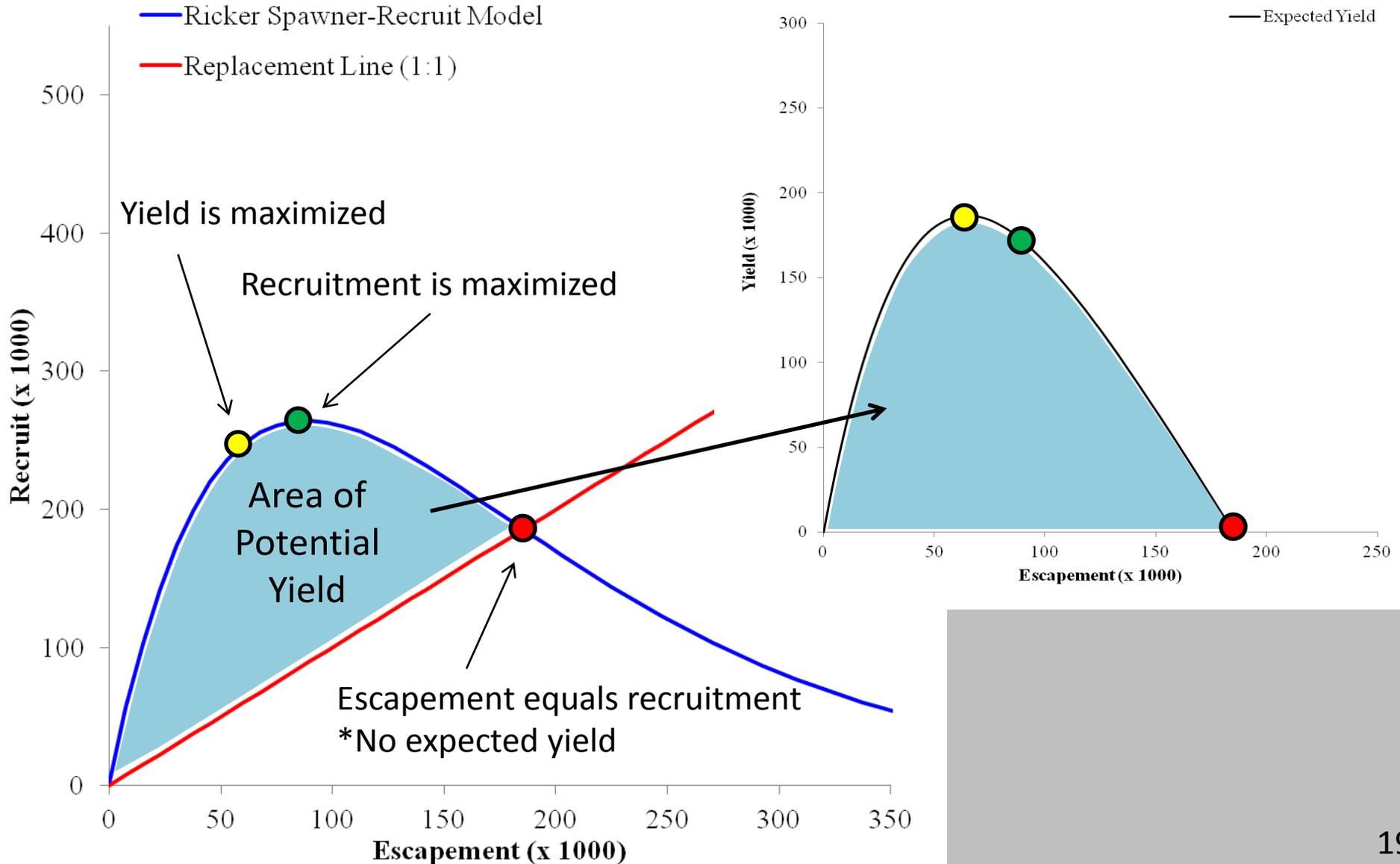
Escapement Goal Review

Objective

- 1) Describe the productivity and capacity of the Kuskokwim River King salmon stock, as quantified from stock-recruit analyses.
- 2) Recommend a drainagewide escapement goal based on results of spawner-recruit analyses.

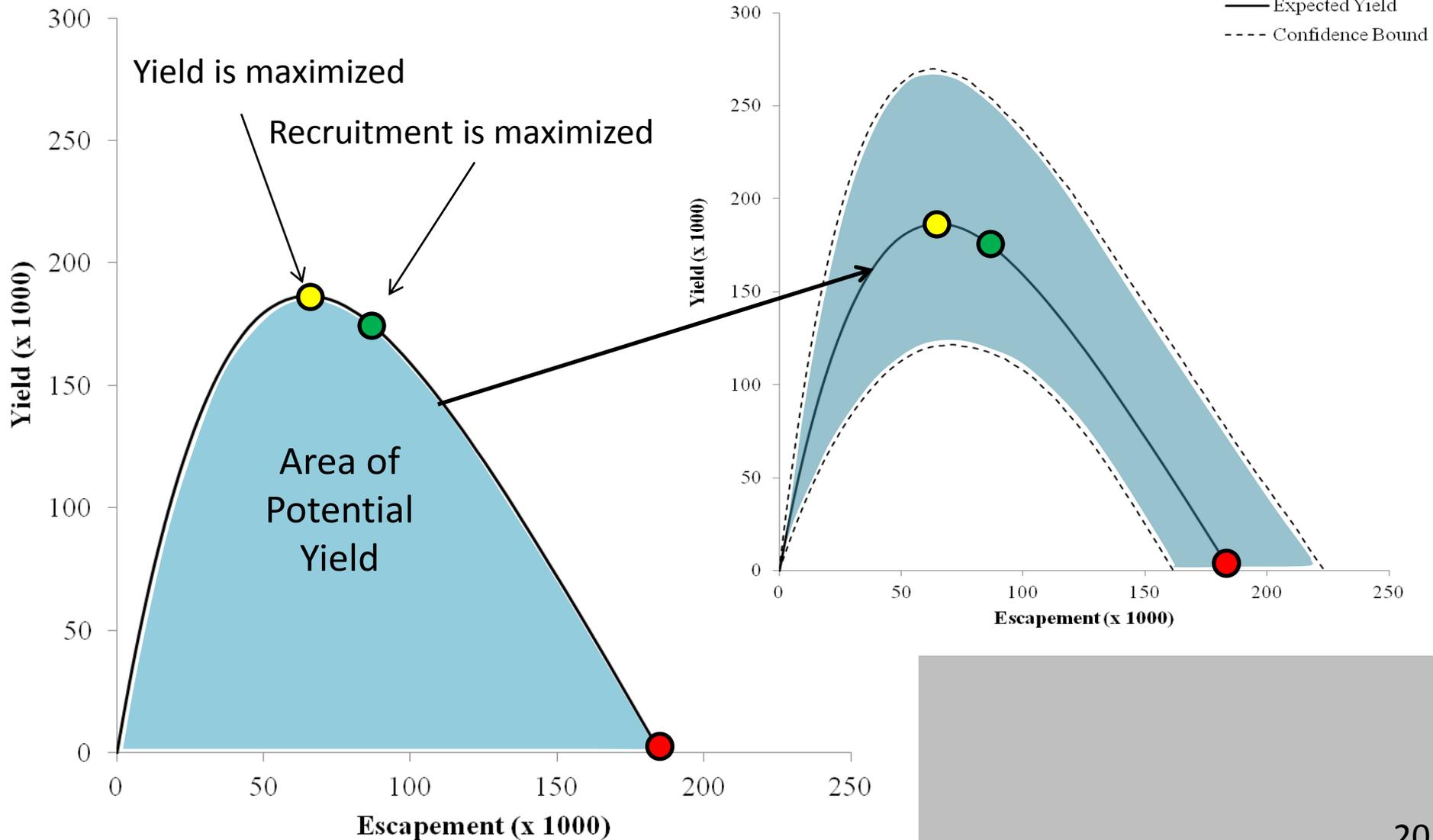
Drainagewide Escapement Goal

Graphing Yield



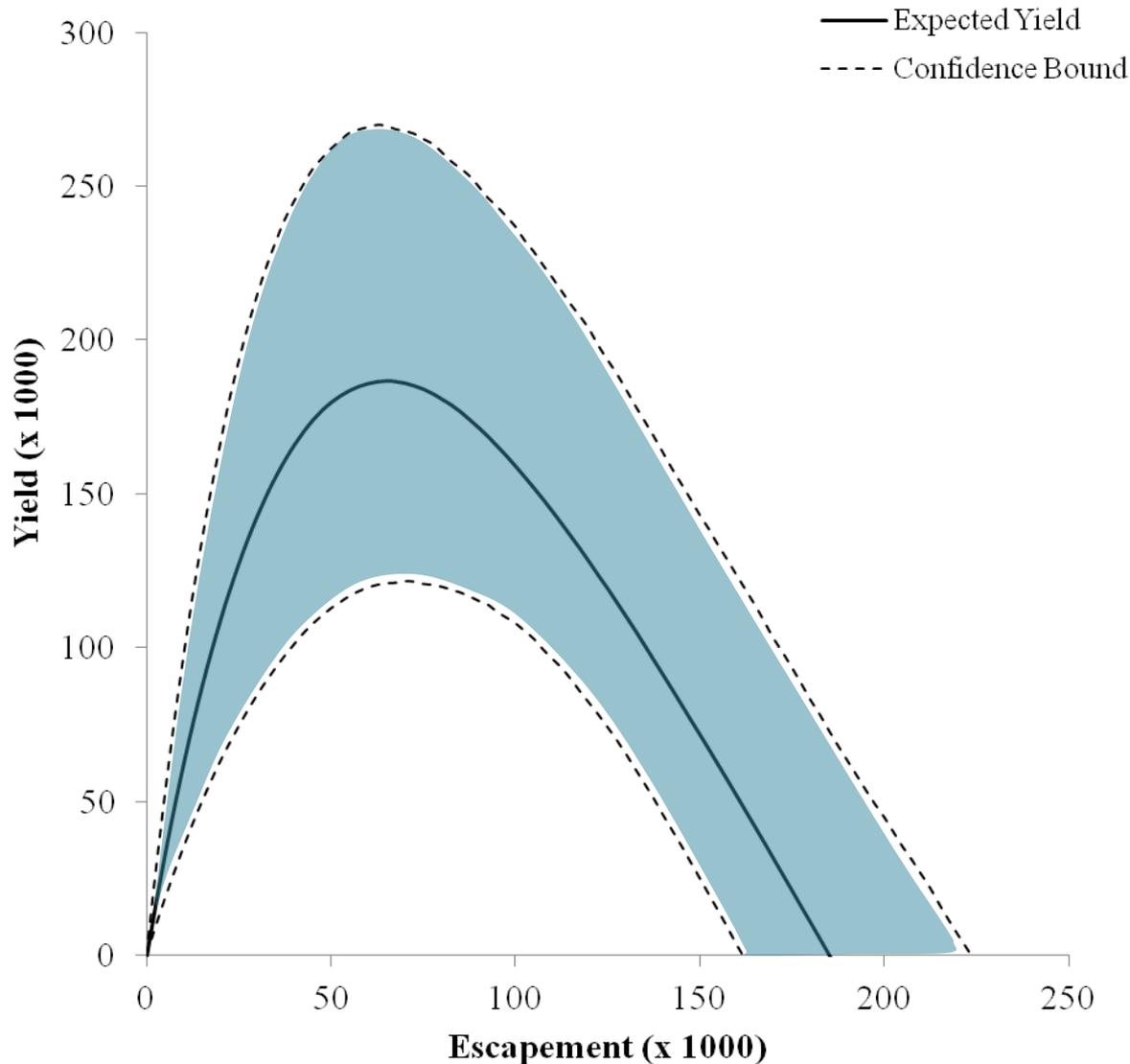
Drainagewide Escapement Goal

Uncertainty around expected yield



Drainagewide Escapement Goal

Yield Considerations: Graphing Yield



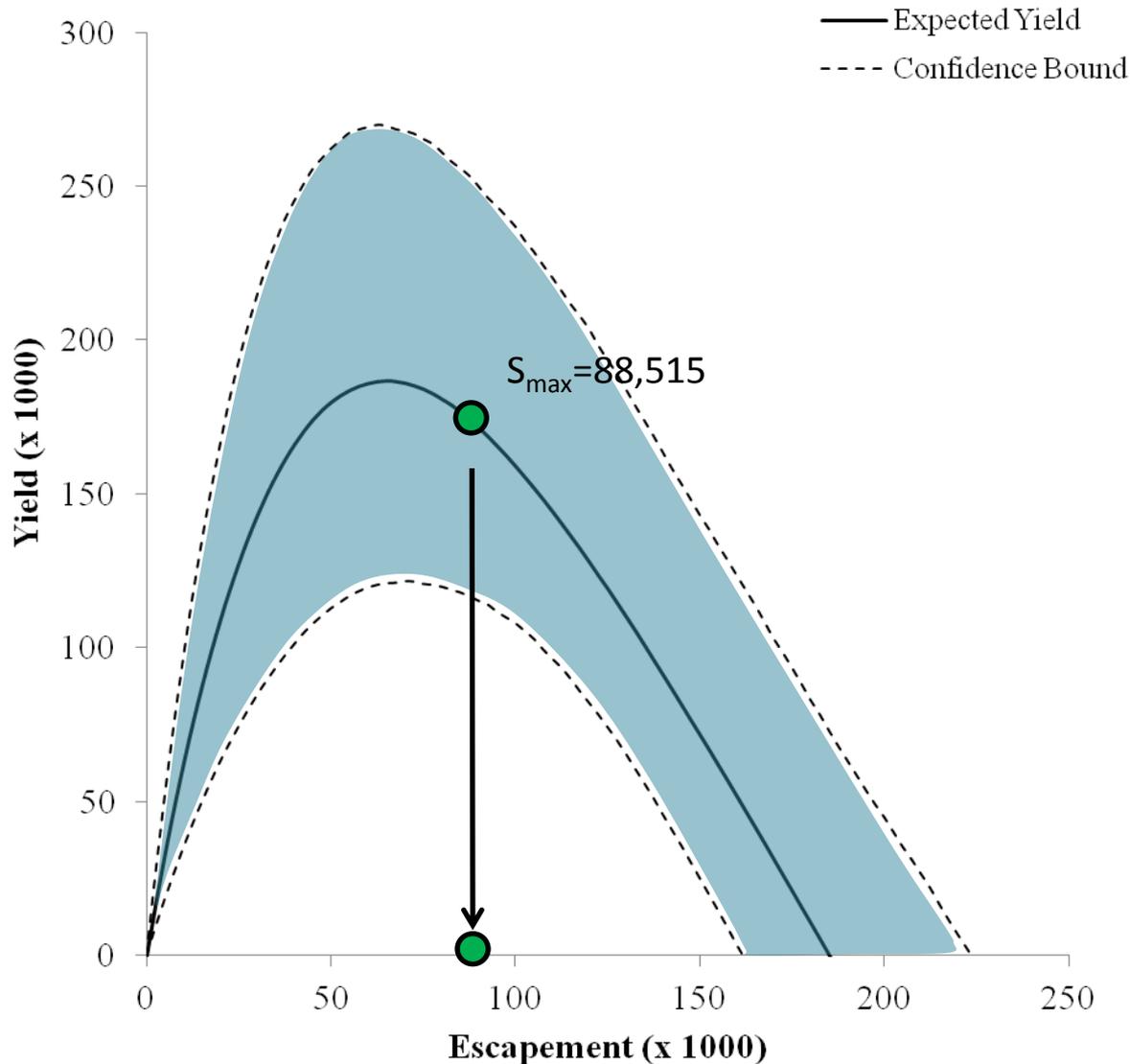
A range of expected yields can be determined for different levels of spawning escapements.

A wide range of escapements can produce sustained yield.

Choice of escapement level depends on the type of fisheries being managed.

Drainagewide Escapement Goal

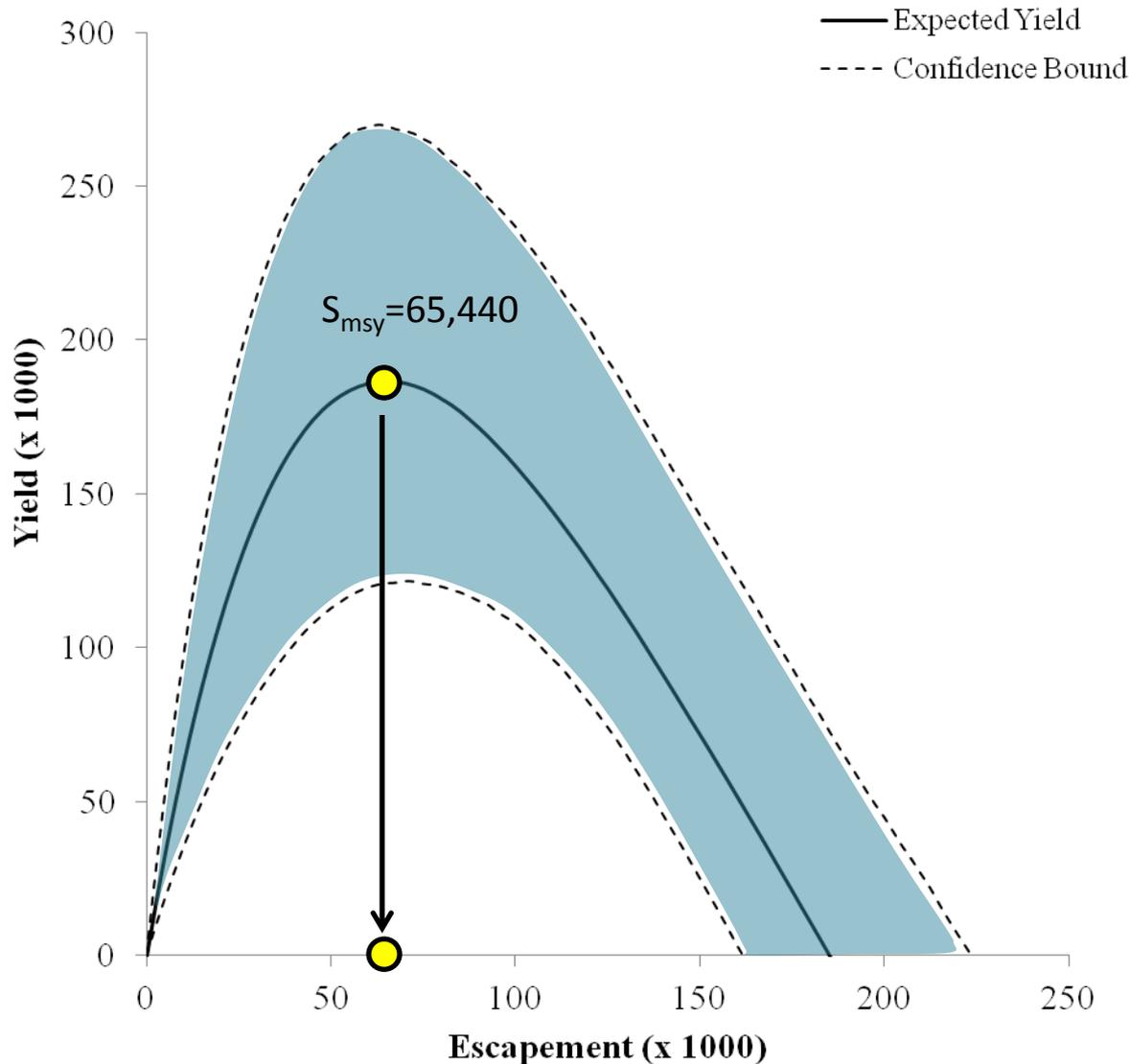
Yield Considerations: Range Determination



Subsistence fisheries benefit from higher escapements that maximize recruitment. Commonly referred to as “Spawner at Maximum Recruitment”, S_{\max} .

Drainagewide Escapement Goal

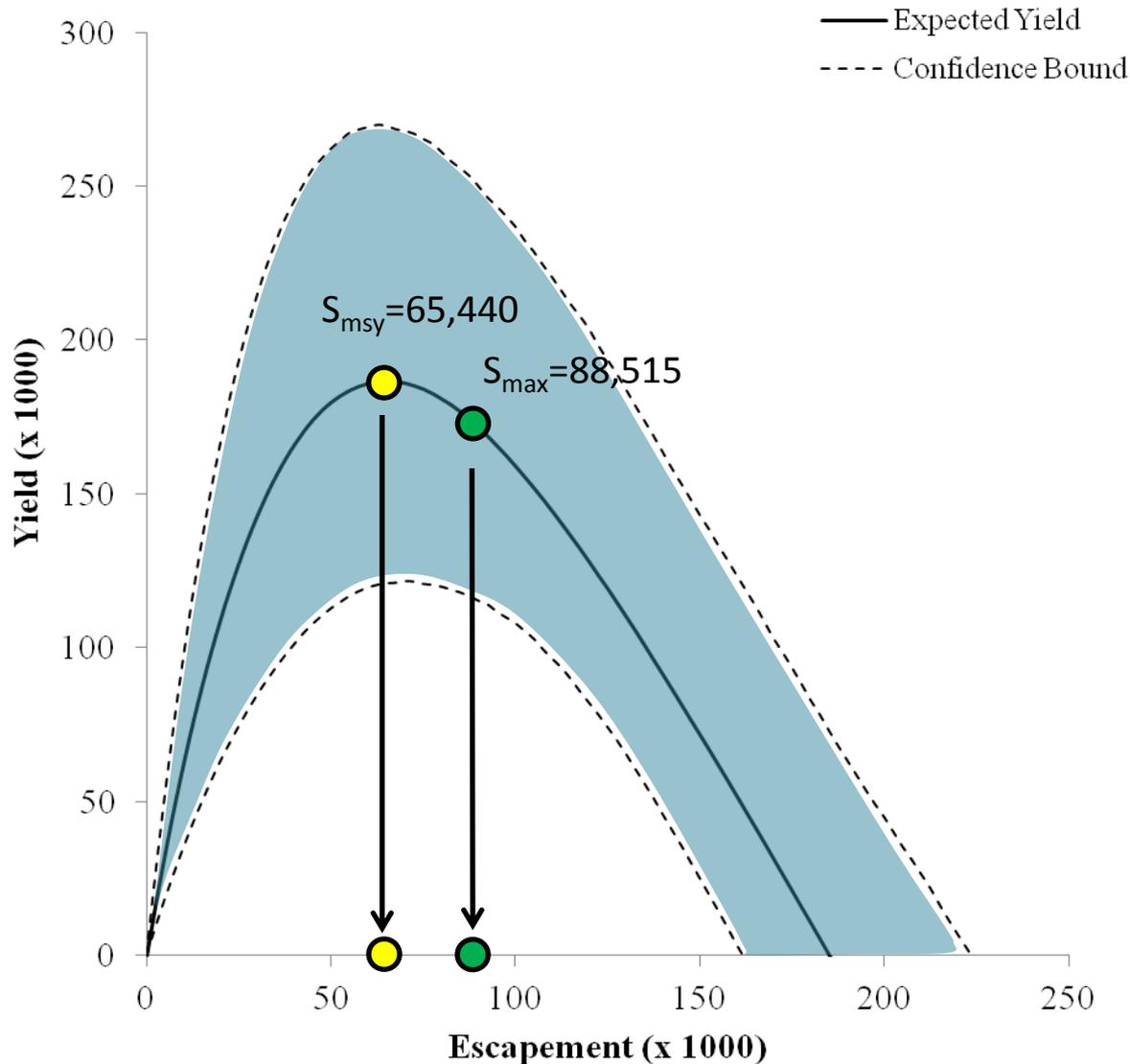
Yield Considerations: Range Determination



Commercial fisheries benefit from escapements that maximize yield. Commonly referred to as “Spawner at Maximum Sustained Yield”, S_{msy} .

Drainagewide Escapement Goal

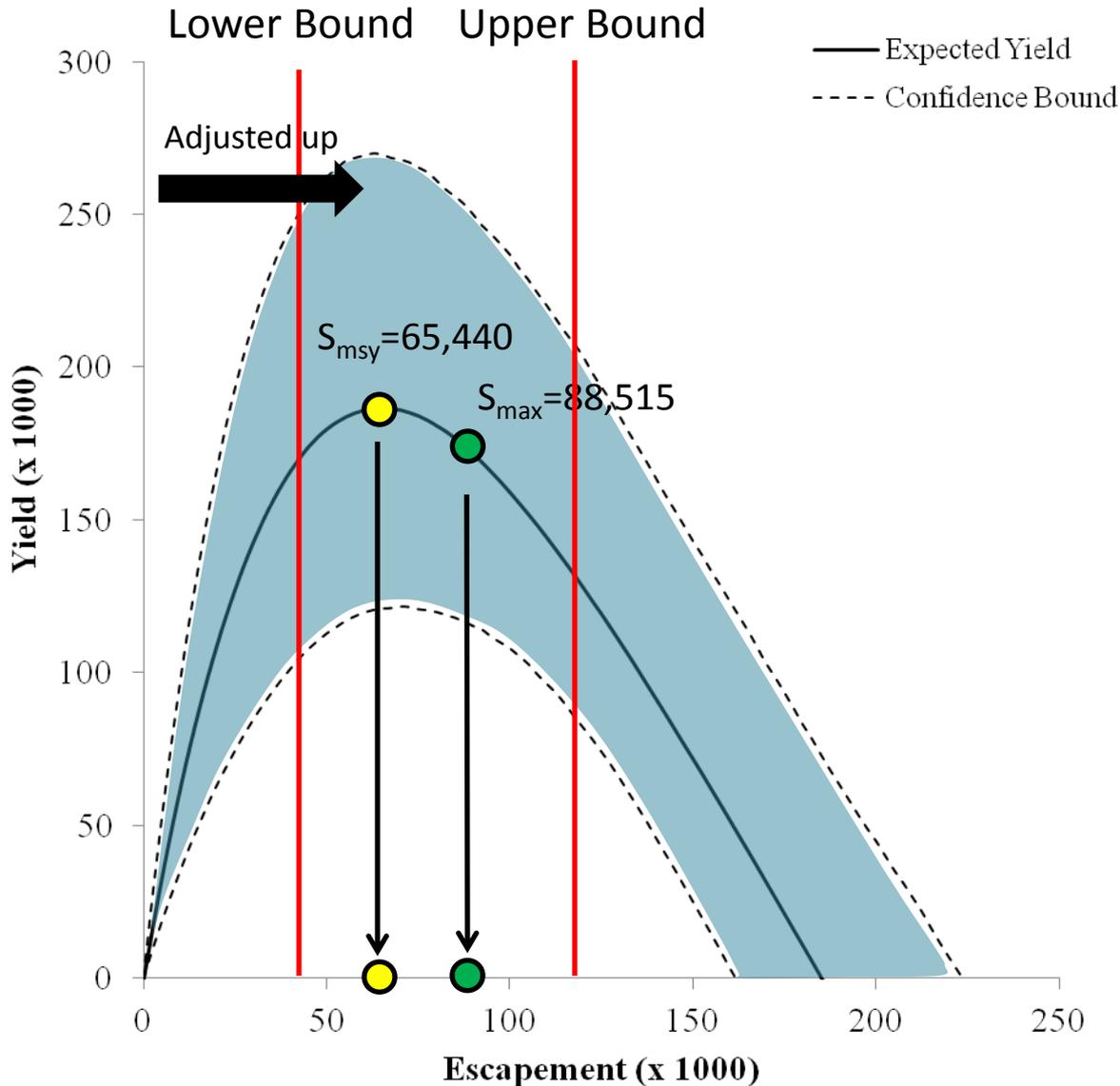
Yield Considerations: Range Determination



Spawning escapements corresponding to S_{max} and S_{msy} were considered.

Drainagewide Escapement Goal

Yield Considerations: Range Determination

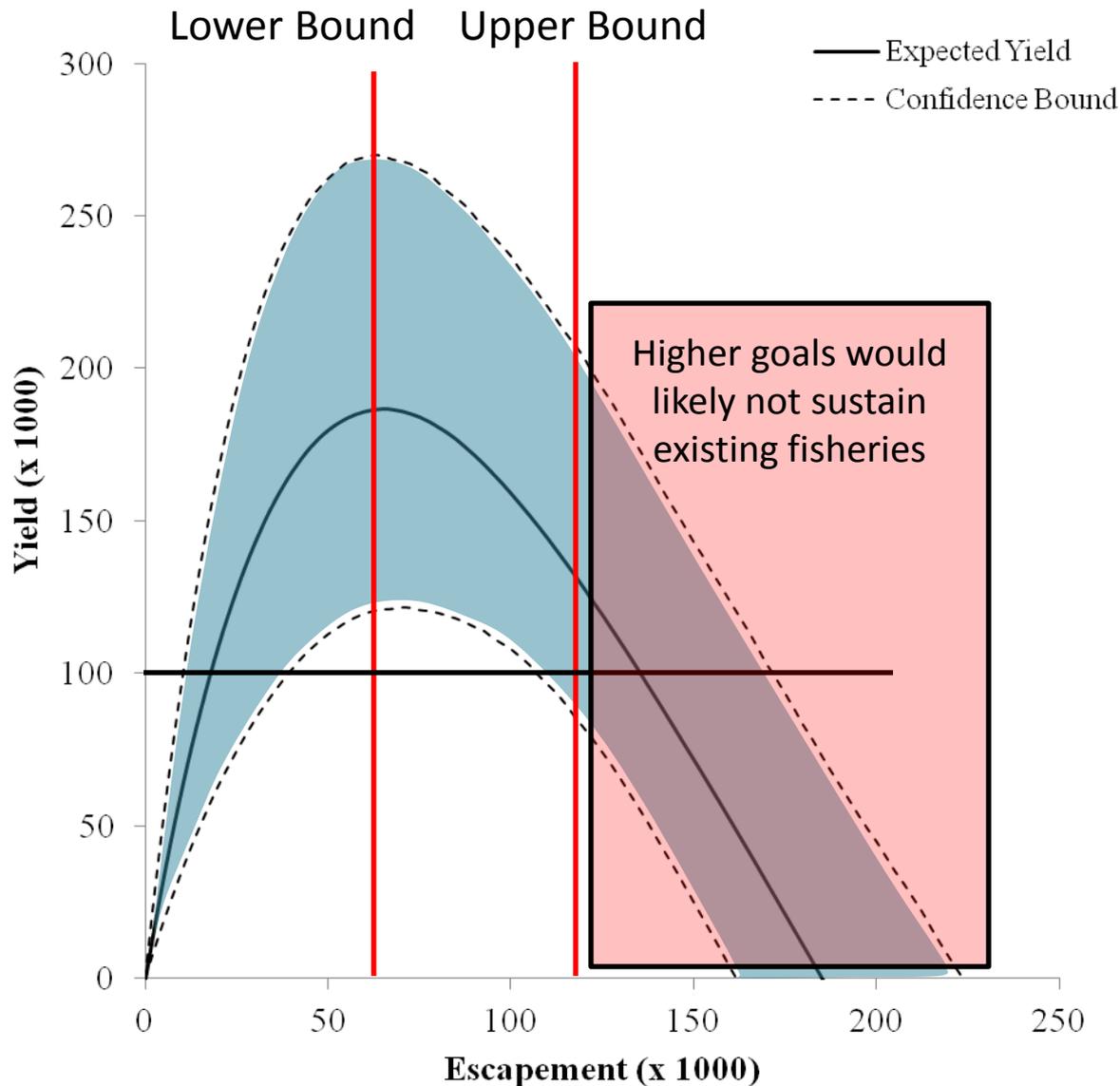


Lower bound
maximizes yield.

Upper bound
maximizes returns.

Drainagewide Escapement Goal

Yield Considerations: Expected Performance

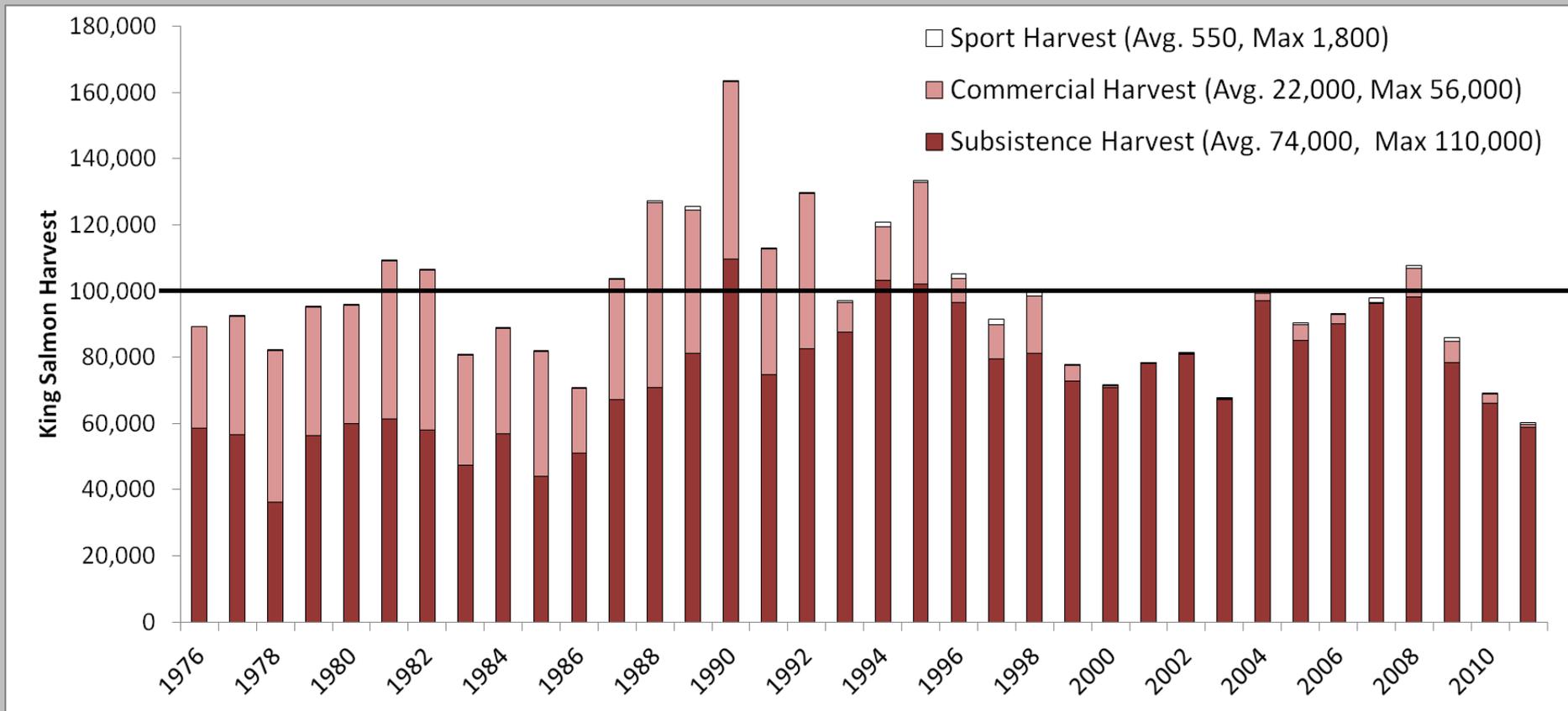


Recommend SEG
goal range of
65,000–120,000.

95% chance of
producing average
yields exceeding
100,000.

Kuskokwim River King Salmon

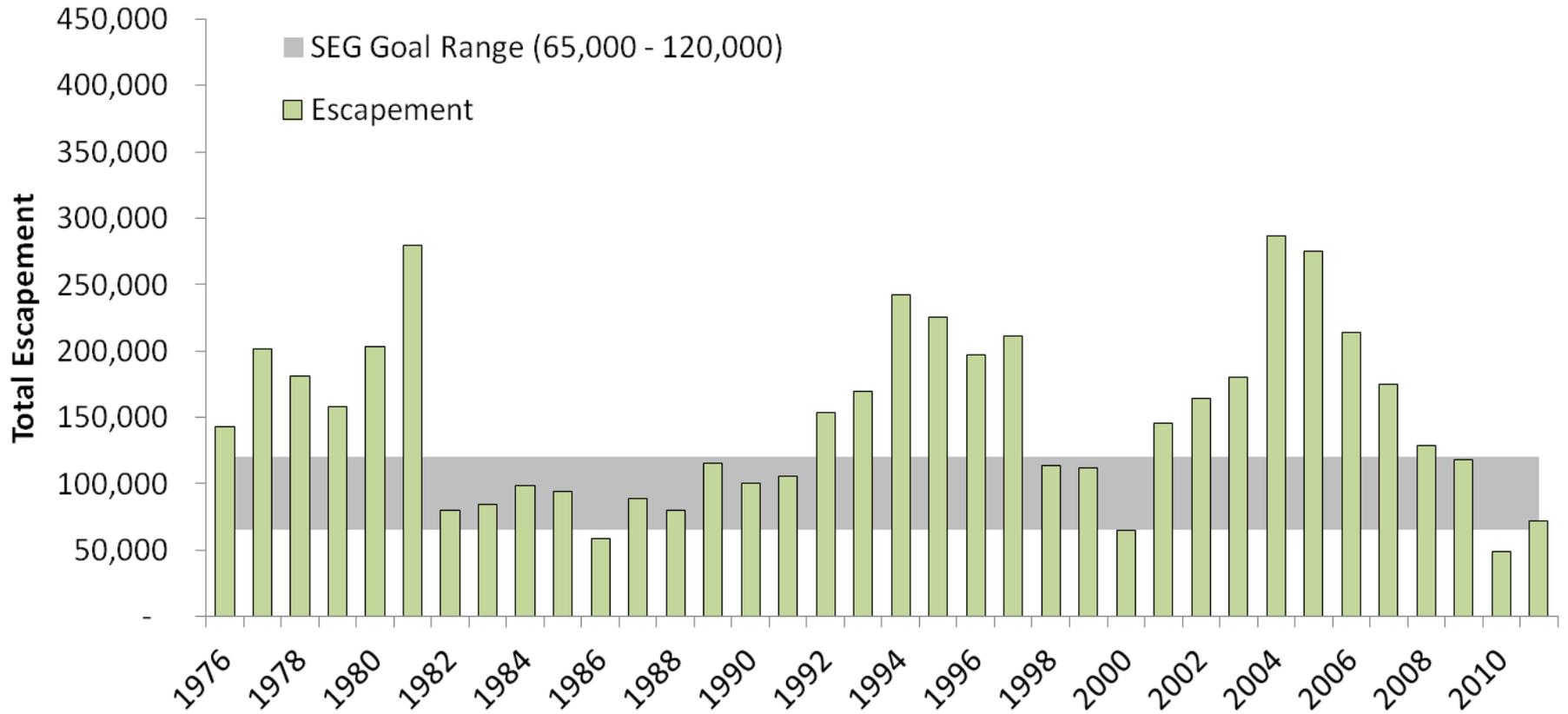
Historical Harvest



- Yields from goal (65,000–120,000) are expected to exceed 100,000.
- Average total harvest (all fisheries) = 96,500.
- Number of years with subsistence harvest >100,000 = 3.
- Max subsistence harvest = 110,000.

Drainagewide Escapement Goal

Historical Escapements



- Years below goal = 2.
- Years within goal range = 14.
- Years above goal = 20.

Escapement Goal Review

Objective

- 1) Describe the productivity and capacity of the Kuskokwim River King salmon stock, as quantified from spawner-recruit analyses.
- 2) Recommend a drainagewide escapement goal based on results of stock-recruit analyses.
- 3) **Revise escapement goals for selected tributaries.**

Tributary Escapement Goals

Weirs

Takotna River Weir
No Existing Goal

Tatlawiksuk River Weir
No Existing Goal

Tuluksak River Weir
Existing Goal: 1,000–1,200

George River Weir
Existing Goal: 3,100–7,900

Kwethluk River Weir
Existing Goal: 6,000–11,000

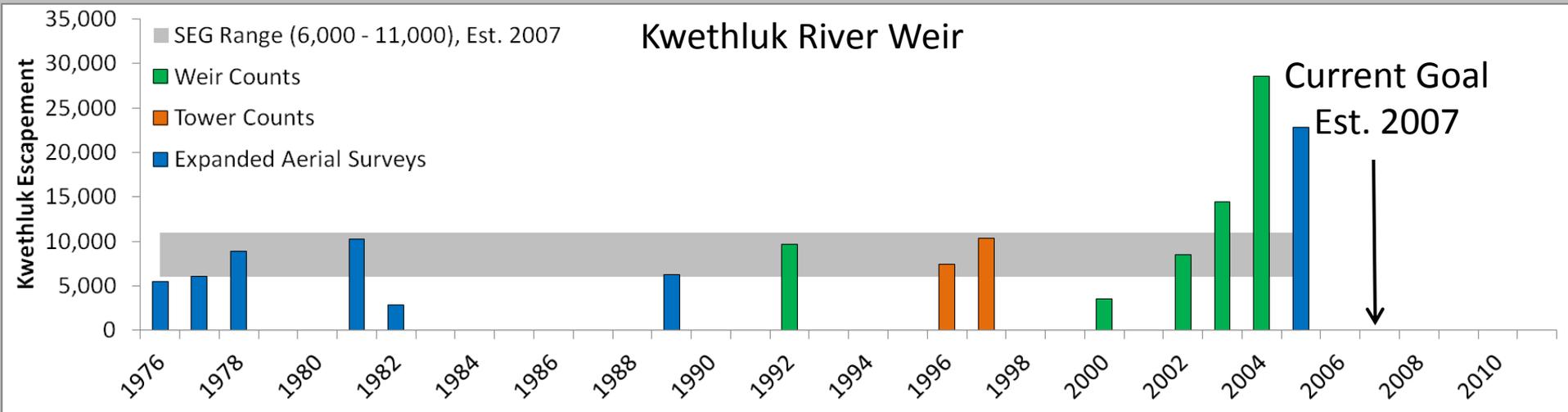
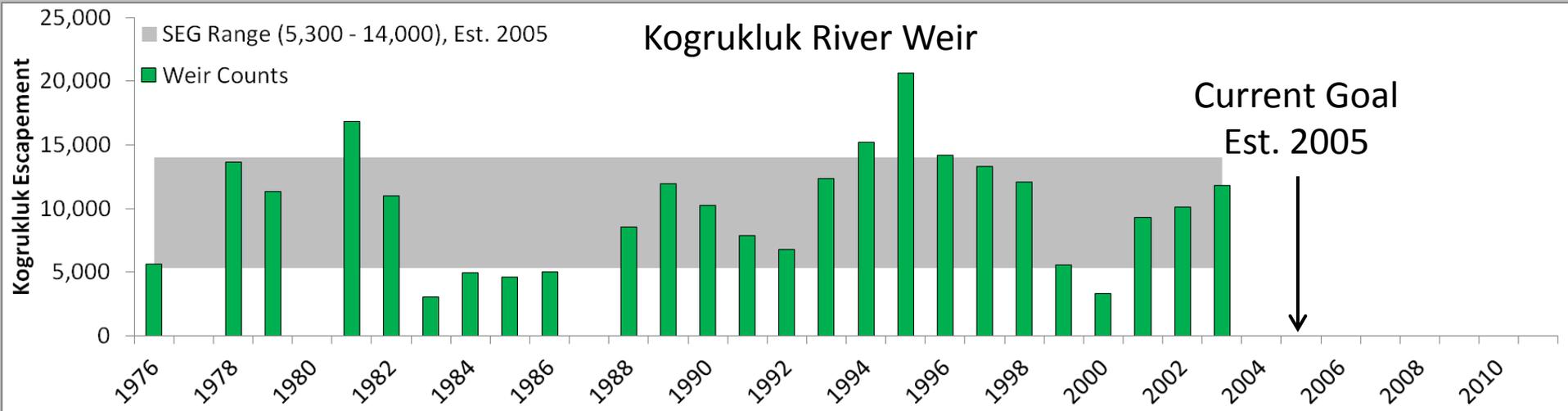
Kogruklu River Weir
Existing Goal: 5,300–14,000

0 50 100 200 Kilometers



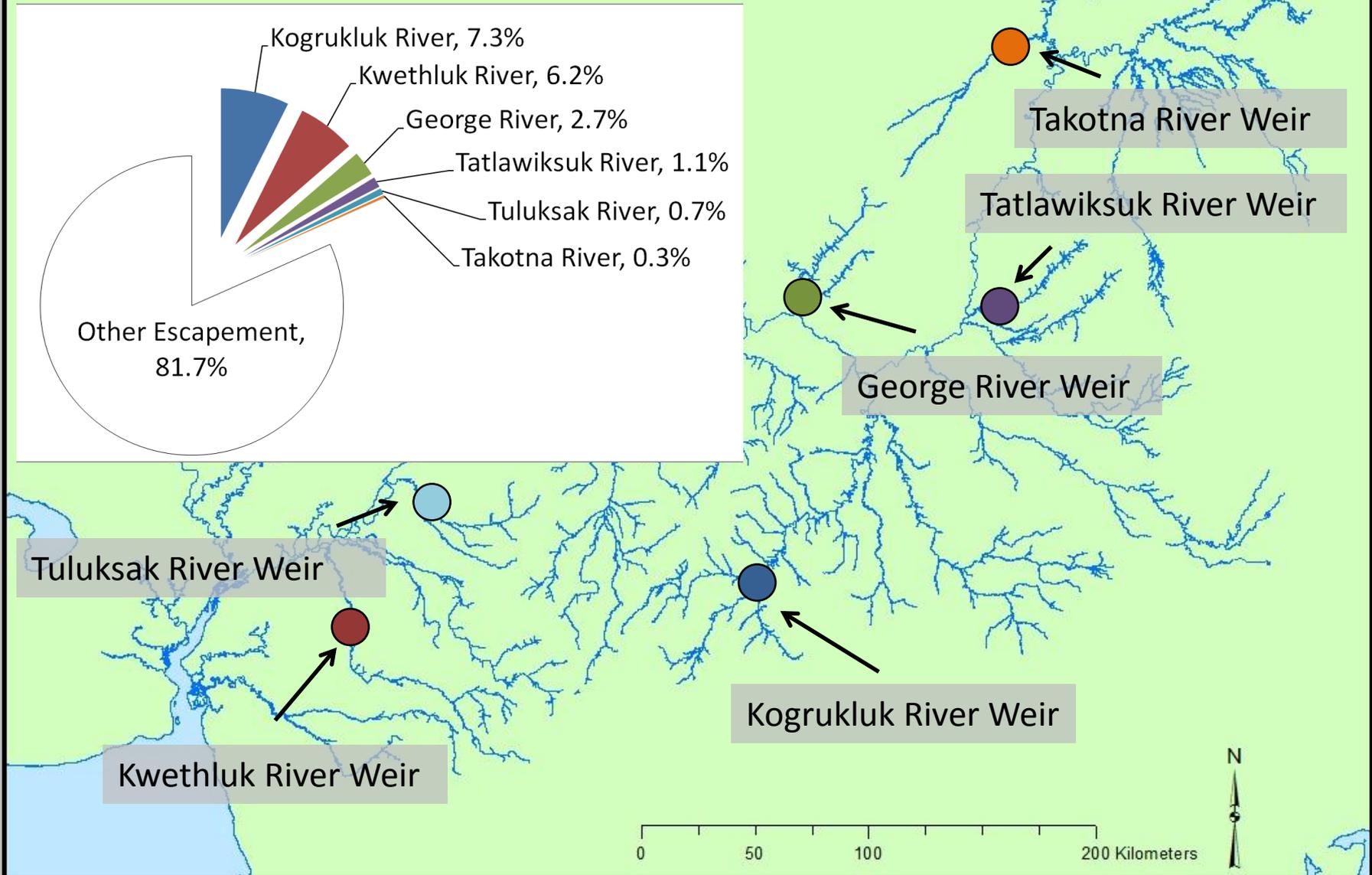
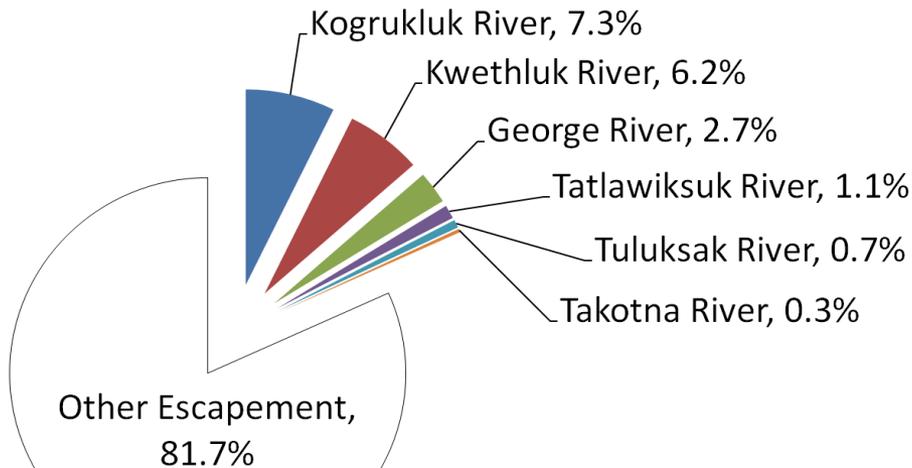
Tributary Escapement Goals

Data Quality Example



Tributary Escapement Goals

Percent Contribution



Tributary Escapement Goals

Discontinue Tuluksak River SEG

Rationale:

- Represents <1% of total escapement.
- Variable run size (201–2,917).
- Habitat degradation.
- Other goals index lower river.
- Department can take conservation action as warranted.



Tuluksak River Weir
Discontinue Goal

Kwethluk River Weir
Revise Goal

Kisaralik River Aerial Survey
No Change to Goal

0 50 100 200 Kilometers



Tributary Escapement Goals

Recommendation

Stock	Percent of Total Escapement	Lower SEG	Upper SEG
Kuskokwim River	100%	65,000	120,000
Kwethluk	6.2%	4,100	7,500
Kogrukluk	7.3%	4,800	8,800
George	2.7%	1,800	3,300

Tributary goals were determined by multiplying the upper and lower bounds of the drainagewide goal by the average proportional escapement in each tributary and standard rounding conventions.

Summary

- Based on best available information.
- Drainagewide goal.
 - Same scale as harvest and management;
 - Expectation of adequate sustainable yield;
 - Conservative.
- Revised tributary goals.
 - Monitor adequacy of spatial distribution;
 - Same scale as drainagewide goal;
 - Conservative.
- Discontinued goal.
 - Does not eliminate need to monitor sensitive stock.
 - Does not preclude conservation action.

Acknowledgements

Many contributed to the collection of data and model development that made these analyses possible.

Many more provided the department with input and perspective.

Thank You!

Kuskokwim River Salmon Stock Status and Fishery Overview



Report to the Alaska Board of Fisheries
Presented by Travis Elison

Oral: RC 7, Tab 3
Written: RC 3, Tab 3

Outline

- Area Background
- Management
- Stock Status
- Preview relevant proposals
 - Proposal 105: *Kuskokwim River Salmon Management Rebuilding Plan, 5 AAC 07.365.*



Kuskokwim Area



District 1

McGrath

Aniak

Bethel

District 4

District 5

Background

Kuskokwim Bay

- *District 4 Salmon Management Plan, 5 AAC 07.367.*
- Subsistence closed during commercial openings.
- Commercial restricted to 6-inches or less gillnet mesh.
- Emergency orders (EOs) on a schedule.
- Assessment using catch statistics and weir escapements.



Kuskokwim Area



Background

Kuskokwim River Commercial

- Restricted to 6-inches or less gillnet mesh.
- EOs on schedule.
- Based on abundance of chum and coho salmon.
- Guideline harvest range 0 to 50,000 for king and sockeye salmon.



Background

Kuskokwim River Subsistence

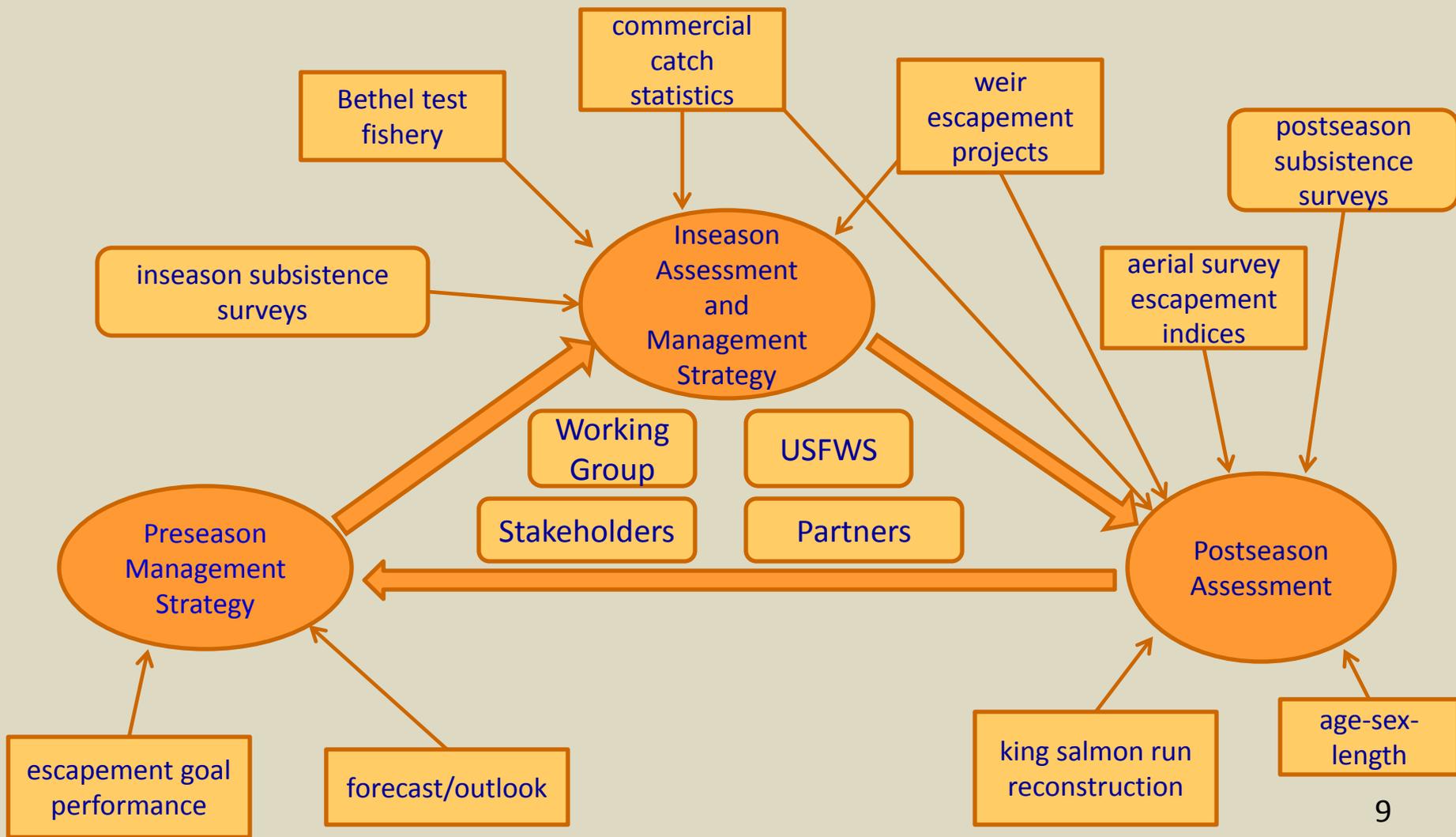
- King salmon subsistence fishery is largest in the state.
- Set and drift gillnets with unrestricted mesh size.
- Harvest concentrated in District 1.
- King salmon restrictions in 2011 and 2012.



Management

- Kuskokwim River salmon fishery is complex:
 - Large river system;
 - Overlapping run timing of different species;
 - Subsistence priority while providing opportunity for other fisheries; and
 - Cooperative/federal management of subsistence fishery.
- Assessment projects operated in collaboration with partners.
- Management strategies and actions developed in collaboration with Working Group, USFWS, and other interested stakeholders.

Management



Management

Kuskokwim River King Salmon 2011

- Preseason subsistence salmon fishing closures in tributaries.
- Inseason management in the mainstem:
 - 9 days subsistence salmon fishing closures;
 - 3 days with gillnets restricted to 6-inch or less mesh; and
 - Only District 1 restricted.
- Commercial fishing for chum salmon began July 5 and harvested 748 king salmon during the season.
- Subsistence harvest was slightly lower than the previous year.
- Escapement goals:
 - 1 of 4 weir EGs met.
 - 2 of 5 aerial EGs met.



Management

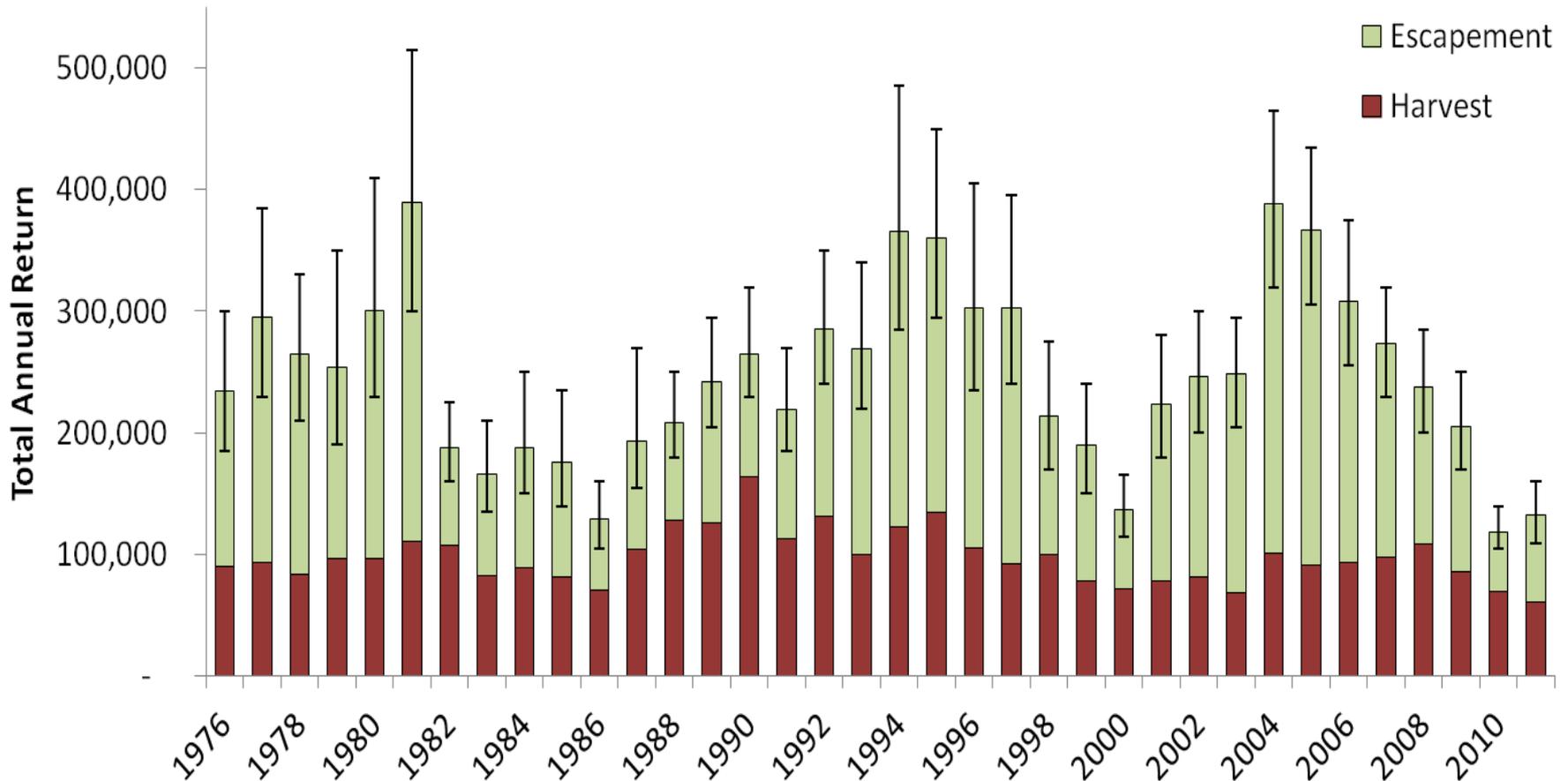
Kuskokwim River King Salmon 2012

- Preseason subsistence salmon fishing closures in tributaries.
- Inseason management actions on the mainstem:
 - 14 days of subsistence fishing closures;
 - 22 days of subsistence fishing restricted to gillnets with 6-inch or less mesh size; and
 - Closures were timed to coincide with salmon migration and included the entire drainage.
- Commercial fishing for chum salmon began on July 13 and harvested 365 king salmon during the season.
- Subsistence harvest is expected to be the lowest observed.
- Escapement Goals:
 - 0 of 2 weir EGs met.
 - 2 of 5 aerial survey EGs met.



Stock Status

Kuskokwim River King Salmon



Stock Status

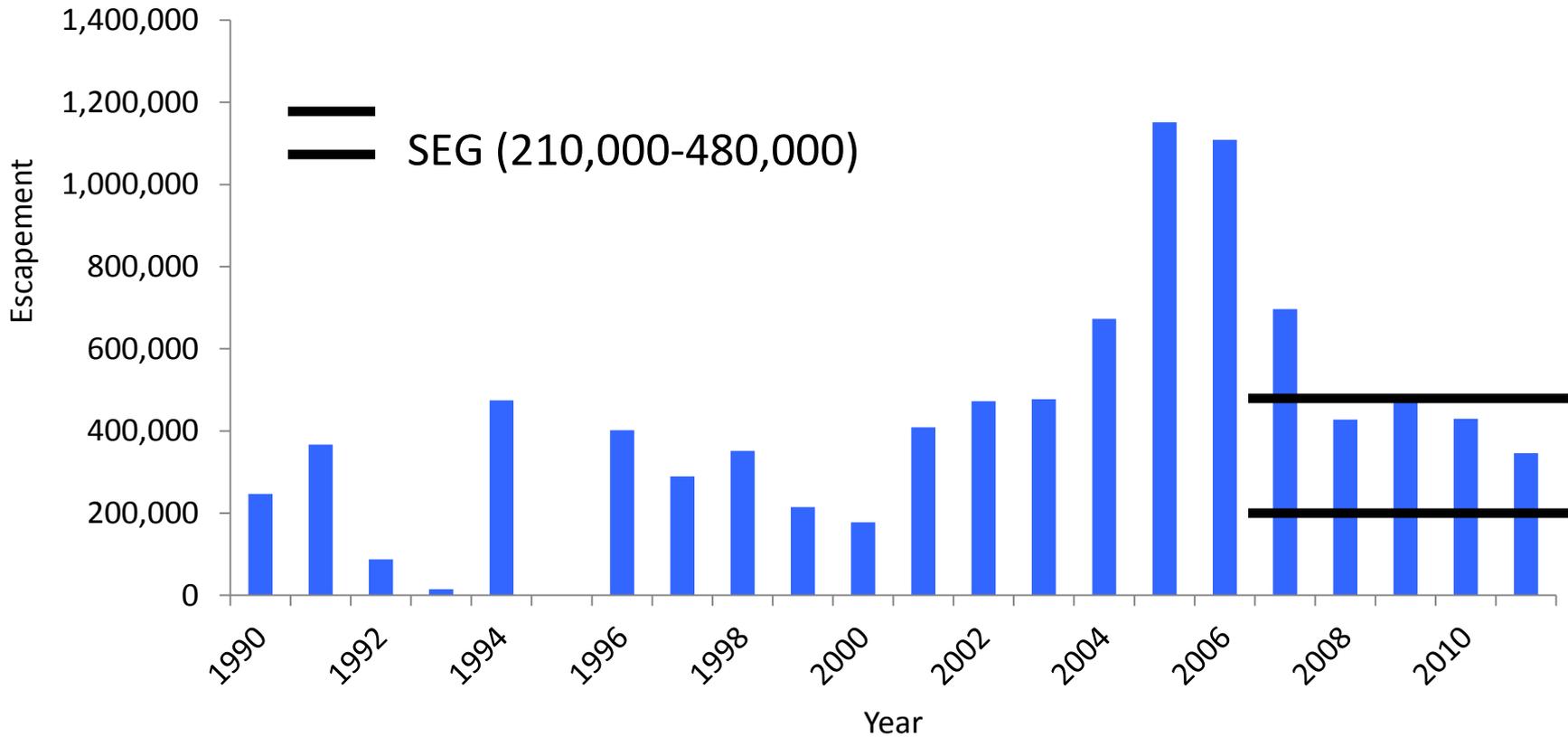
Kuskokwim River Chum Salmon



Stock Status

Kuskokwim River Chum Salmon

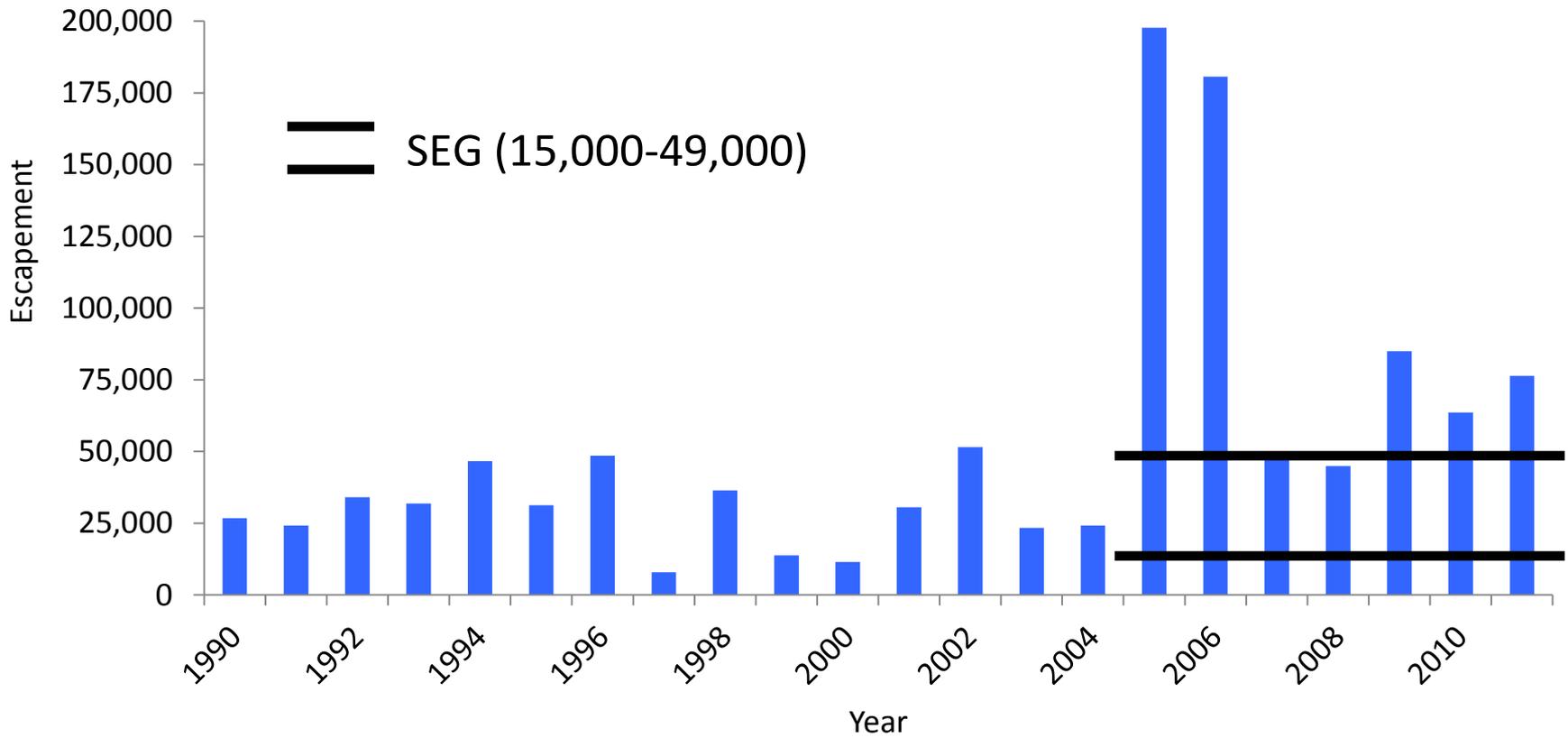
Aniak Sonar



Stock Status

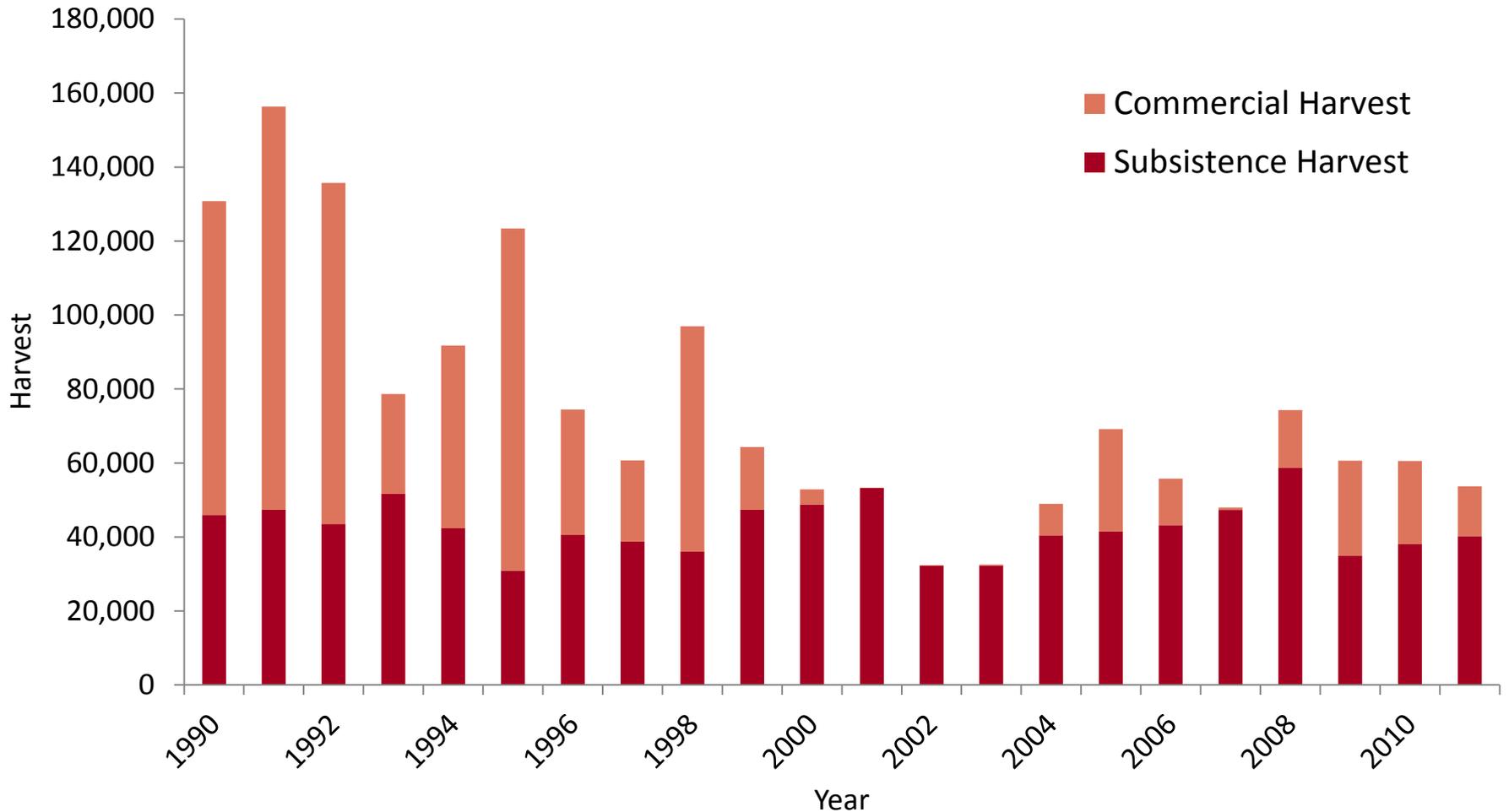
Kuskokwim River Chum Salmon

Kogrukluik Weir



Stock Status

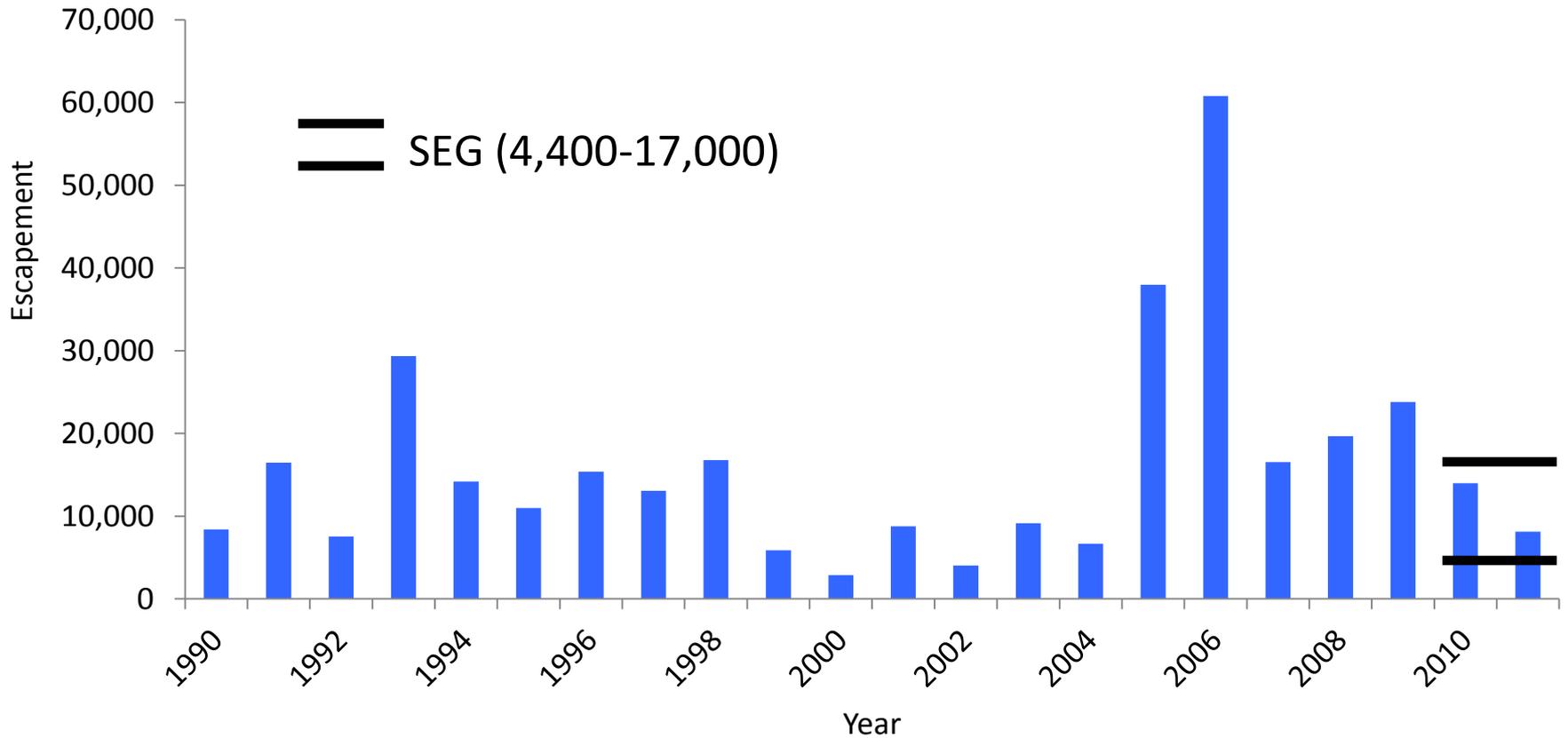
Kuskokwim River Sockeye Salmon



Stock Status

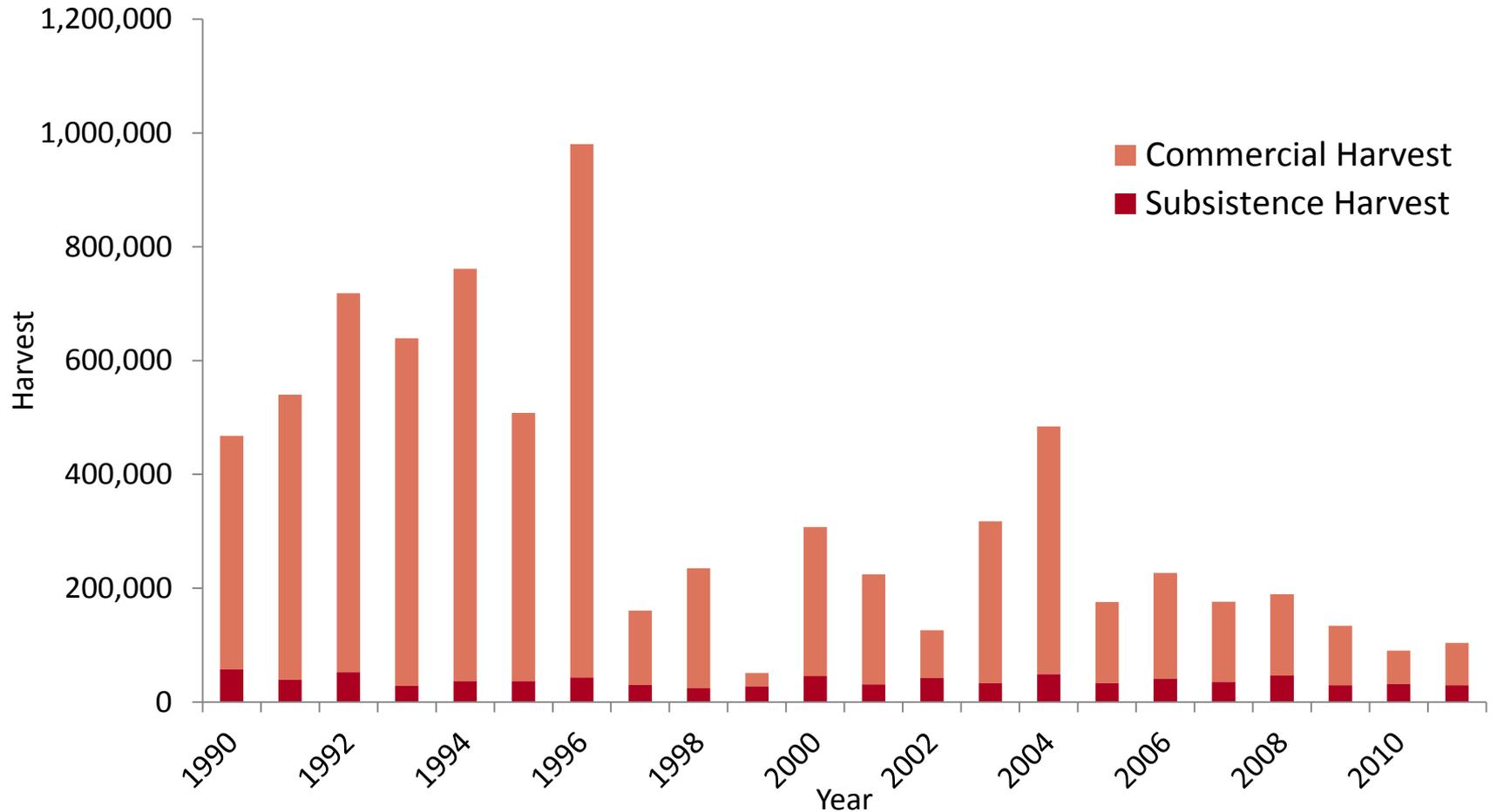
Kuskokwim River Sockeye Salmon

Kogrukluk Weir



Stock Status

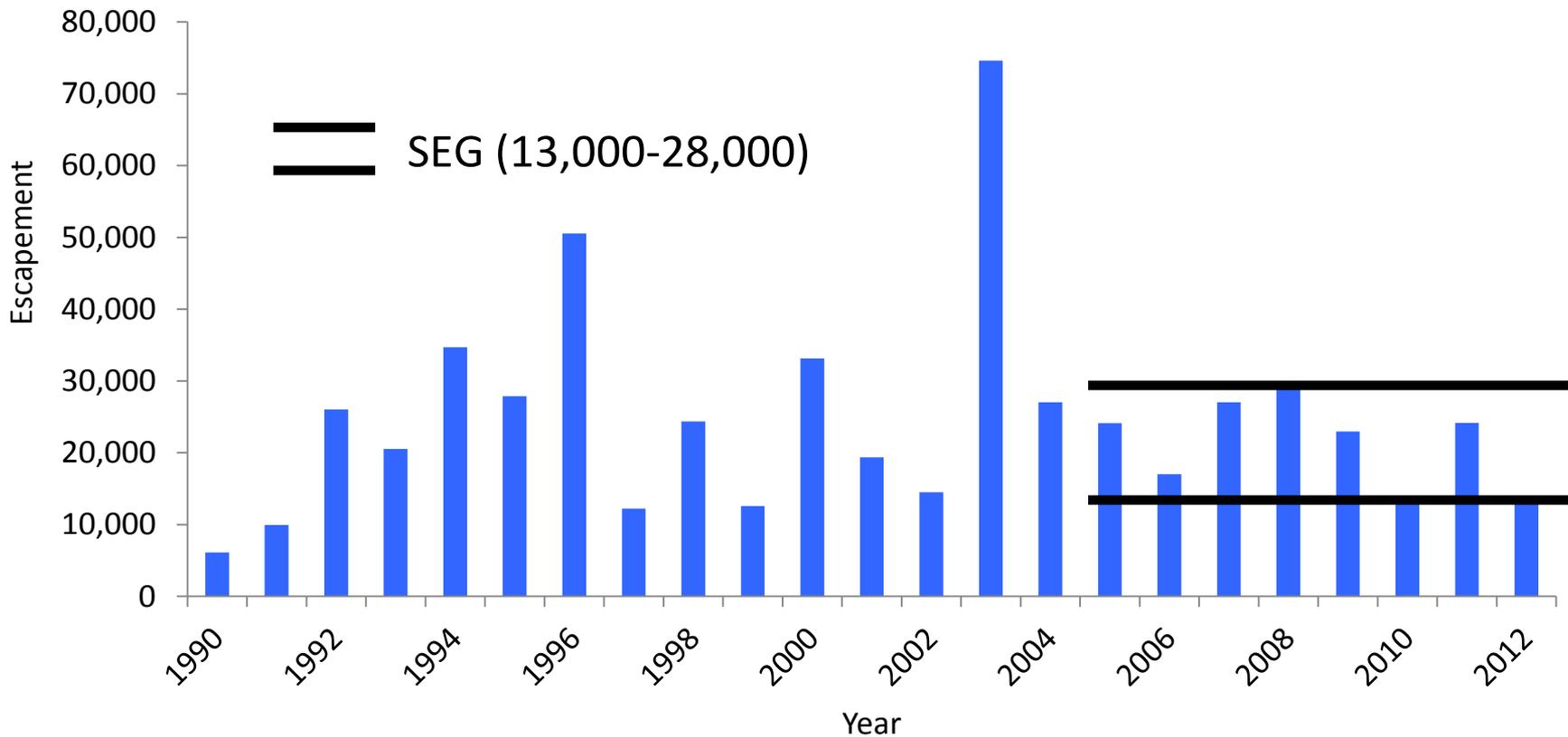
Kuskokwim River Coho Salmon



Stock Status

Kuskokwim River Coho Salmon

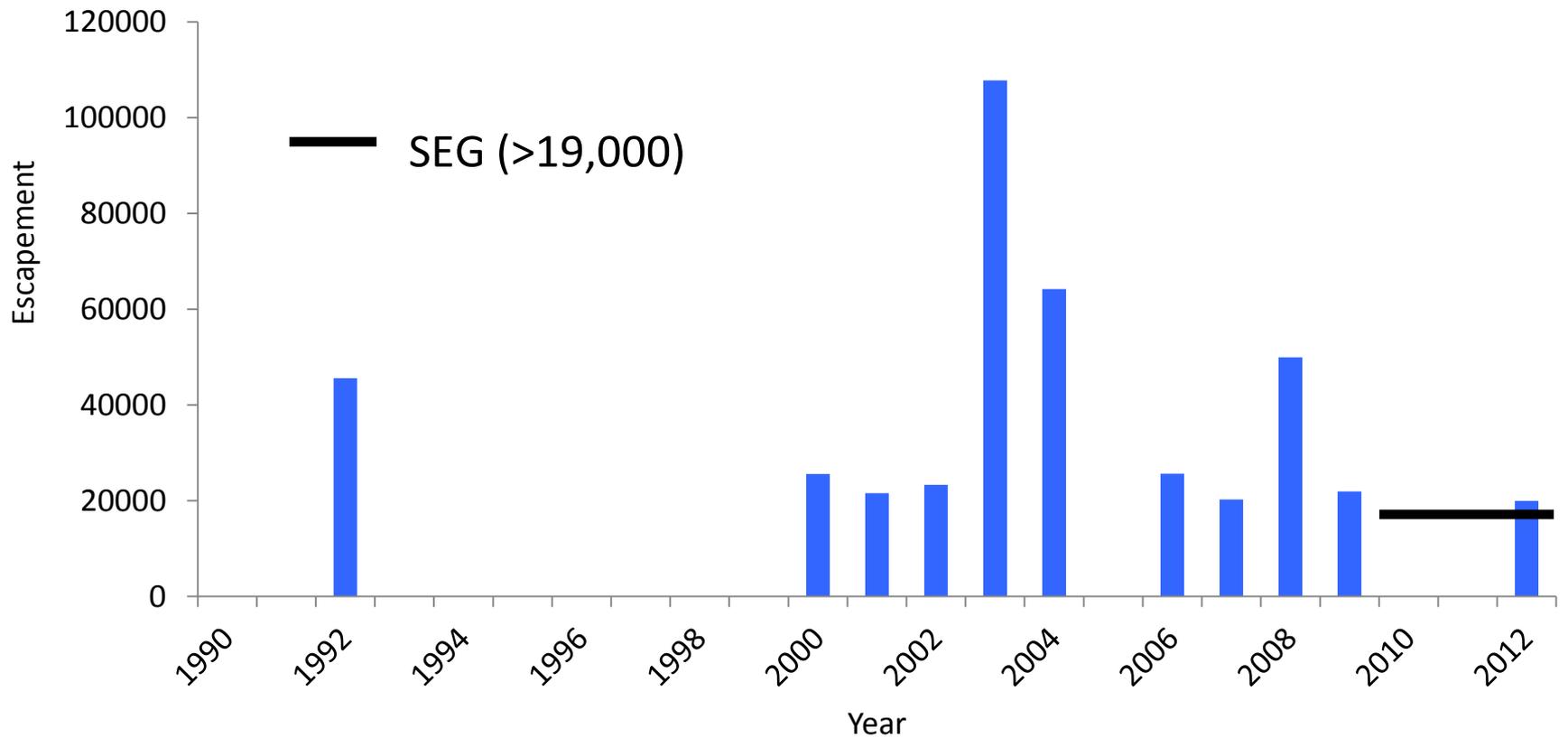
Kogrukluuk Weir



Stock Status

Kuskokwim River Coho Salmon

Kwethluk Weir



Kuskokwim Area Proposals

- Subsistence, Commercial, and Sport
 - **105 – Revise Kuskokwim River Salmon Rebuilding Management Plan.**
 - 106 – Establish king OEGs and revise *Kuskokwim River Salmon Management Plan*.
- Subsistence
 - 104 – Revise ANS to be consistent with updated estimates.
 - 107 – Establish a subsistence king salmon possession limit.
 - 108 – Require permits for transporting subsistence-caught salmon.
 - 109 – Allow for customary trade.
- Subsistence and Sport
 - 112 – Close Kwethluk River salmon fisheries June 1–July 25.
- Commercial
 - 110 – Remove option to allow 8-inch gillnets in District 1.
- Sport
 - 111 – Close Eek River.
 - 113 – Prohibit catch and release fishing on Kanektok and Arolik rivers.
 - 114 – Close salmon spawning beds in Kanektok and Arolik rivers.

Proposal 105: *Kuskokwim River Salmon Management Rebuilding Plan*

- Submitted to:
 - Reflect current management practices.
 - Provide greater flexibility for conservation actions.
 - Provide for subsistence priority.
 - Manage overlapping salmon runs.
- The department, Working Group, and USFWS have been working together to develop a management plan with public input.
- Working Group comments in PC 5.
- Department comments in RC 11.

Proposal 105: *Kuskokwim River Salmon Management Rebuilding Plan*

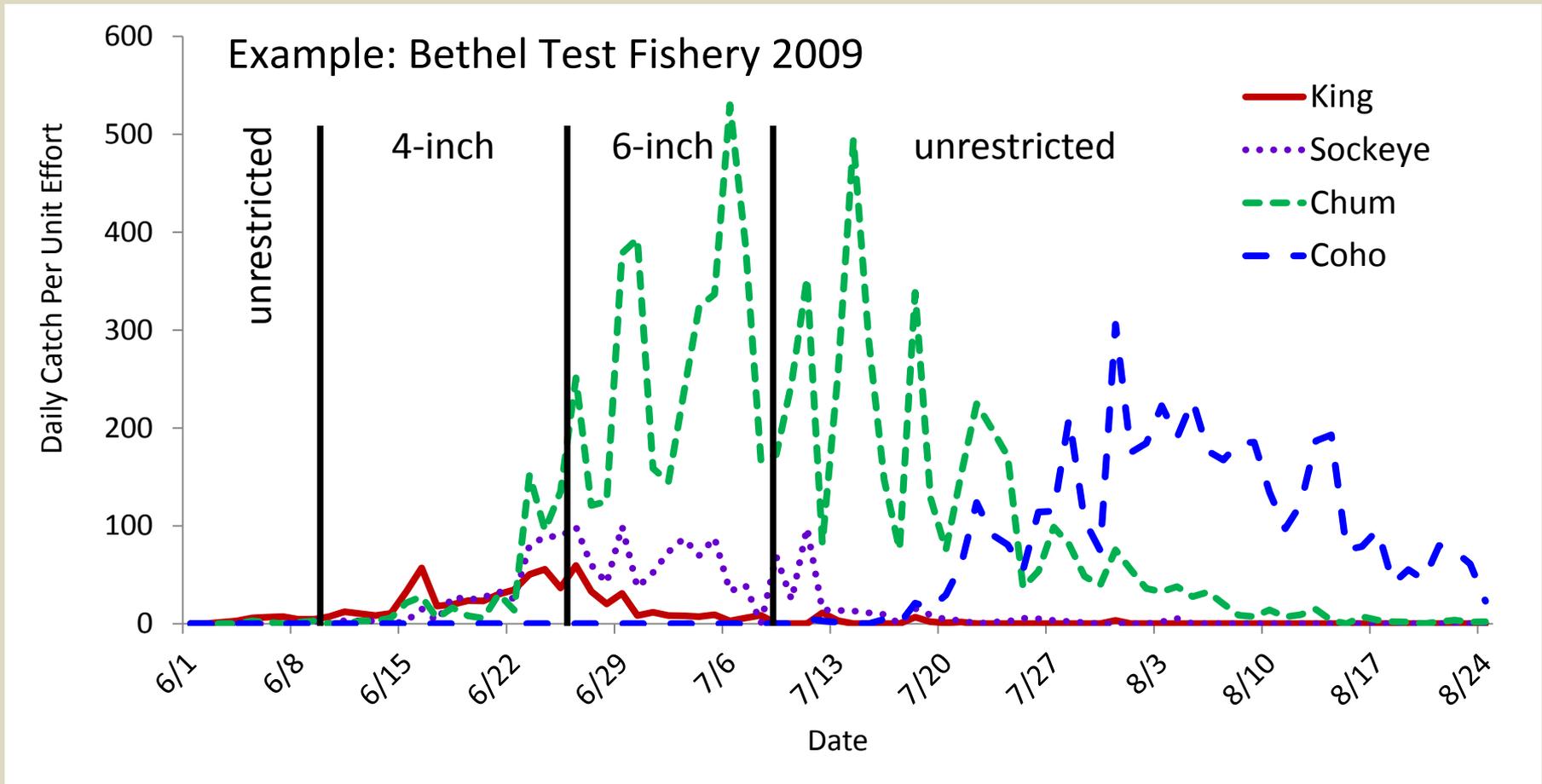
Subsistence Fishery

- Subsistence salmon fishing open seven days per week, unless;
 - For conservation of king salmon:
 - To the extent practicable, provide opportunity on surplus in excess of escapement.
 - Alter fishing periods by EO based on run abundance consistent with migratory timing.
 - Restrict to 4-inch or less mesh early in the run.
 - Restrict to 6-inch or less mesh to harvest chum and sockeye salmon.

Proposal 105: *Kuskokwim River*

Salmon Management Rebuilding Plan

King Salmon Conservation in Subsistence Fishery



Proposal 105: *Kuskokwim River* *Salmon Management Rebuilding Plan* Commercial Fishery

- The Kuskokwim River commercial salmon fishery shall open and close by EO.
- The commercial fishery will not have a significant impact on escapement or allocation of incidentally-harvested king, sockeye, chum, or coho salmon.
- To the extent practicable:
 - Provide commercial opportunity on available king salmon surpluses in excess of subsistence.
 - Manage based on chum run strength when chum are most abundant species.
 - Manage based on coho run strength when coho abundance exceeds chum abundance.

Summary

- Managing low king salmon runs to achieve existing escapement goals resulted in hardships for users.
- We are sensitive to the impacts conservation measures have on users.
- However, ten years of king salmon research resulted in new knowledge and understanding.
- Existing king salmon escapement goals are overly conservative.
- Overall, Kuskokwim Area salmon stocks are sustainable and expected to support current fisheries.

Acknowledgements

- Kuskokwim River Salmon Management Working Group
- United States Fish and Wildlife Service
 - Office of Subsistence Management
 - Yukon Delta National Wildlife Refuge
 - Togiak National Wildlife Refuge
- Coastal Villages Region Fund
- Kuskokwim Native Association
- Orutsararmiut Native Council
- Takotna Tribal Council
- Association of Village Council Presidents

Background of Customary Trade in the Kuskokwim Area



Hiroko Ikuta, Ph.D.
Subsistence Resource Specialist
RC 7, Tab 4



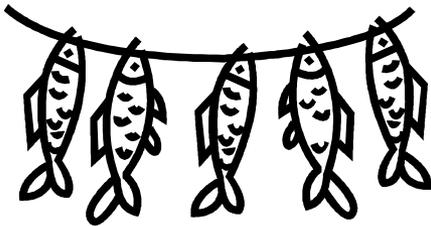
Proposal 109

- Allow limited, noncommercial sales of subsistence-caught fish as customary trade within the Kuskokwim Area under reporting requirements and restrictions similar to Norton Sound-Port Clarence Area (5 AAC 01.188), except the annual household limit would be \$500.

Definition

Customary trade:

“The limited noncommercial exchange, for minimal amounts of cash, as restricted by the appropriate board, of fish or game resources...” (AS 16.05.940(8))



Definition

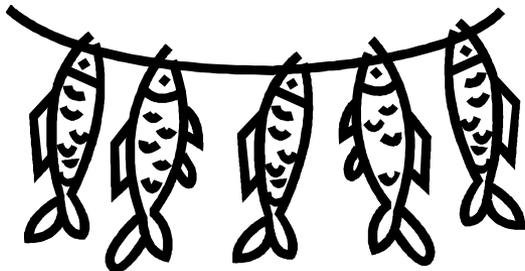
Barter:

“The exchange or trade of fish or game, or their parts, taken for subsistence uses

(A) for other fish or game or their parts; or

(B) for other food or for nonedible items other than money if the exchange is of a limited and noncommercial nature.”

(AS 16.05.940(2))



Current Regulations

- “...it is unlawful to buy or sell subsistence-taken fish, their parts, or their eggs..,” unless specifically allowed by the board.
(5 AAC 01.010(d))
- Two exceptions: herring roe on kelp in Southeast Alaska (5 AAC 01.717) and finfish in the Norton Sound-Port Clarence Area (5 AAC 01.188).

Historical Background (1890s – 20th century)

- Exchange of surplus fish and trade goods and cash/trade tokens at stores.
- Historical record blurs distinction between customary trade and transactions of a more commercial nature.
- Increasing role of cash in 20th century is important trend in this longstanding customary and traditional (C&T) pattern.

Recent Findings

(Ethnographic research in 2009)

- “When 4th of July activities come around, I take some out and I’ve been selling one head for \$1.00 a head. People come around when they want some fish heads for dinner. Good bestsellers last year.” (Tuntutuliak)
- “There are some families that do sell their fish. At the stores I see people advertising that they’re selling fish for extra income.” (Kwethluk)
- Noncommercial exchanges of subsistence resources for cash appear to occur at low levels.

State Subsistence Procedures

- Are there customary and traditional (C&T) uses of fish in the Kuskokwim Area? – **Yes.**
- Are there harvestable surpluses of fish in the Kuskokwim Area? – **Yes.**
- Do the harvestable surpluses allow for all, or only some, uses? - **Board determination.**

- ❖ Currently **no provision** for customary trade in the Kuskokwim Area.
 - Board must determine whether customary trade is part of the C&T pattern of use of the finfish.
 - The determination should be based on the historical practice of customary trade, not the abundance of salmon.

Options

If the board finds customary trade is part of the C&T pattern of use, the board

- **May adopt as written.**
- **May amend to:**
 - Apply to certain fish species;
 - Apply to fish processed in certain ways;
 - Require permit; and/or
 - Establish specific dollar limits on customary trade or other restrictions.

If the board finds customary trade is not part of the C&T pattern, the board

- **May take no action.**



Questions?

Norton Sound Chum and King Salmon Stocks of Concern



**A Report to the Alaska Board of Fisheries, January, 2013
Presented by Jim Menard and Scott Kent**

**RC 3: Written Reports, tabs 4 and 5
RC 7: Oral Reports, tab 5**

Norton Sound Chum Salmon Stocks of Concern



- Areas of Chum Salmon Stocks of Concern
- Stock Status Harvest and Escapement
- Proposals

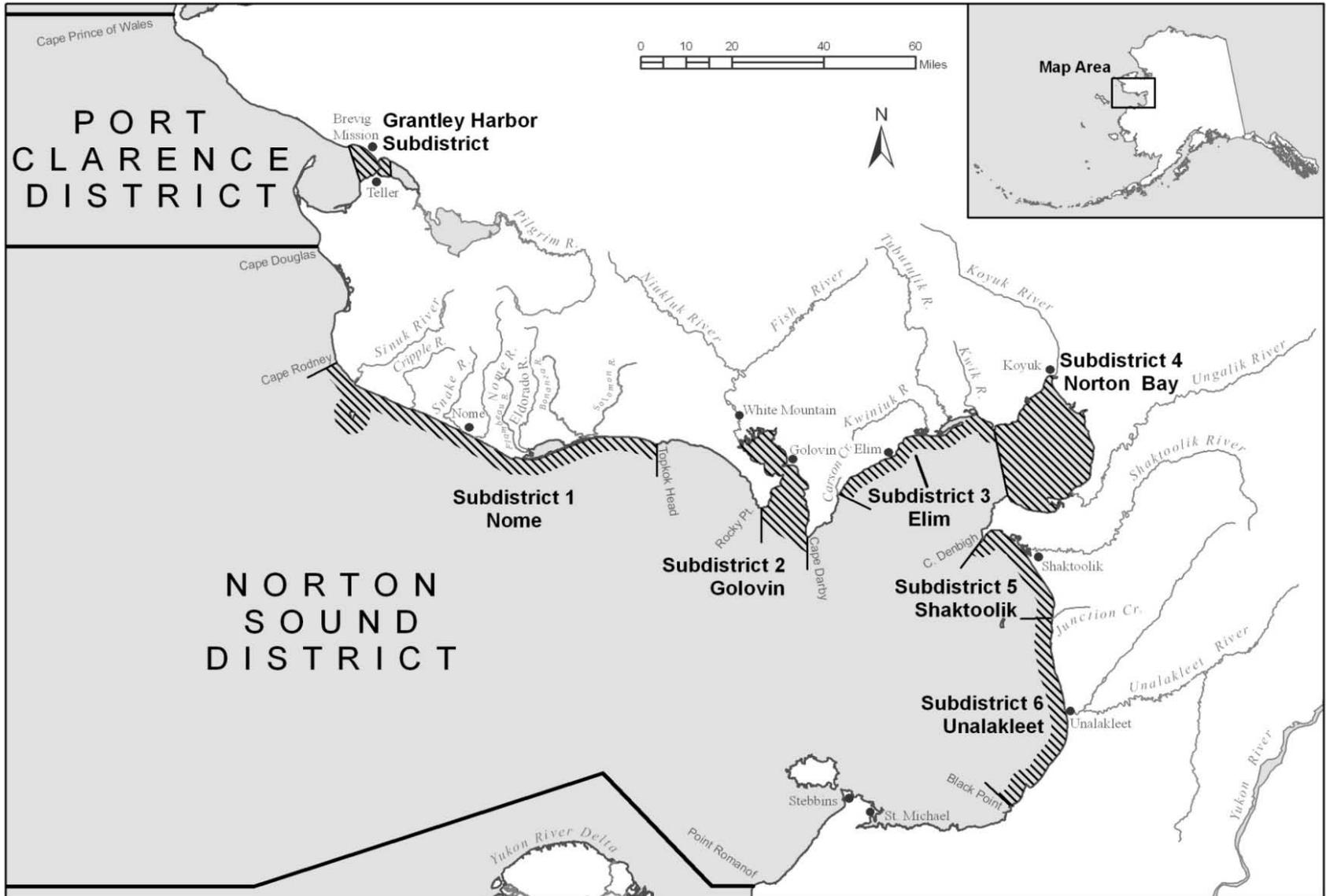
- Northern Norton Sound (subdistricts 1–3)
- Department Recommendation

Norton Sound King Salmon Stocks of Concern

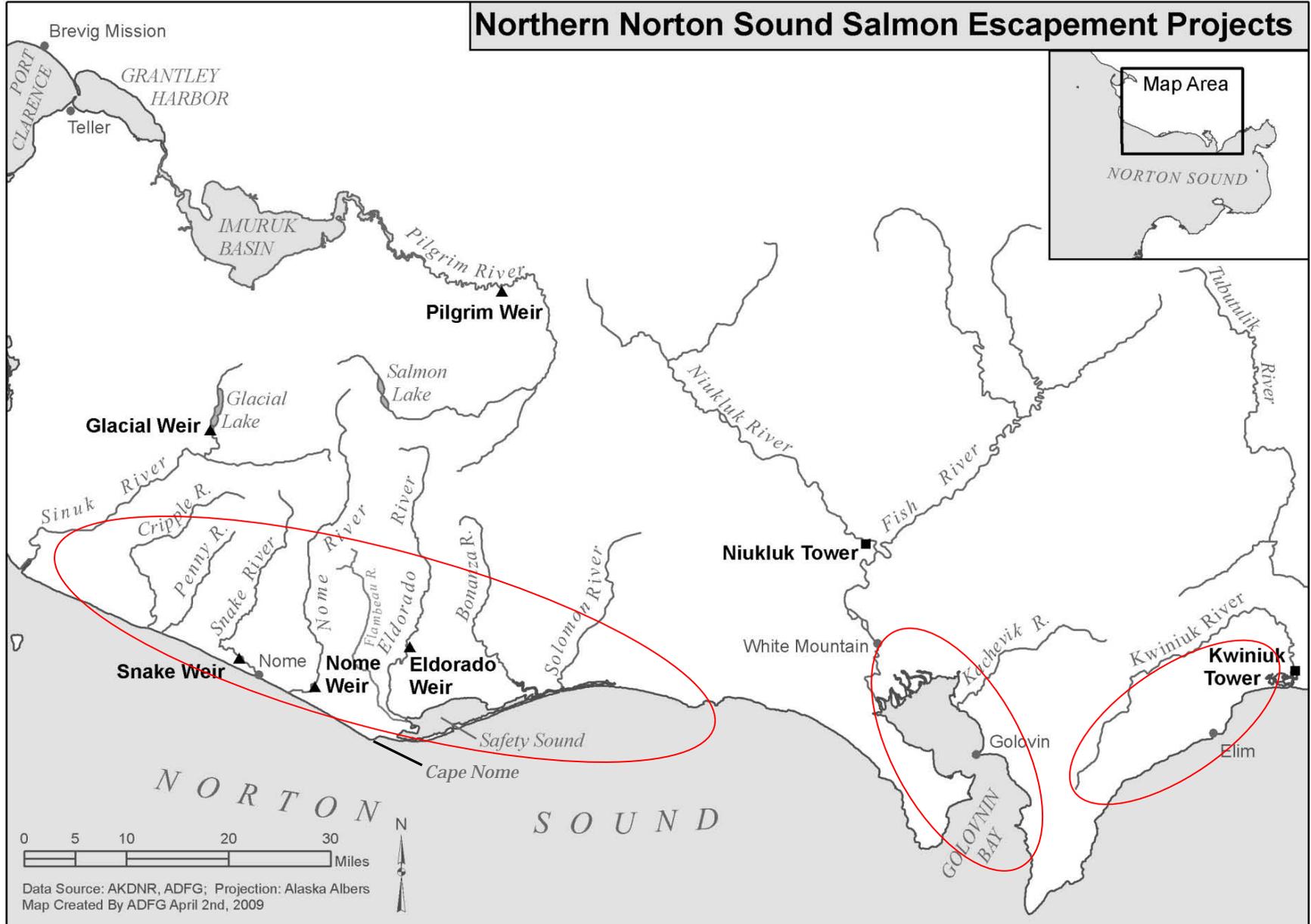
- Areas of King Salmon Stocks of Concern
- Southern Norton Sound (subdistricts 5–6)
- Stock Status Harvest and Escapement
- Department Recommendation
- Proposals



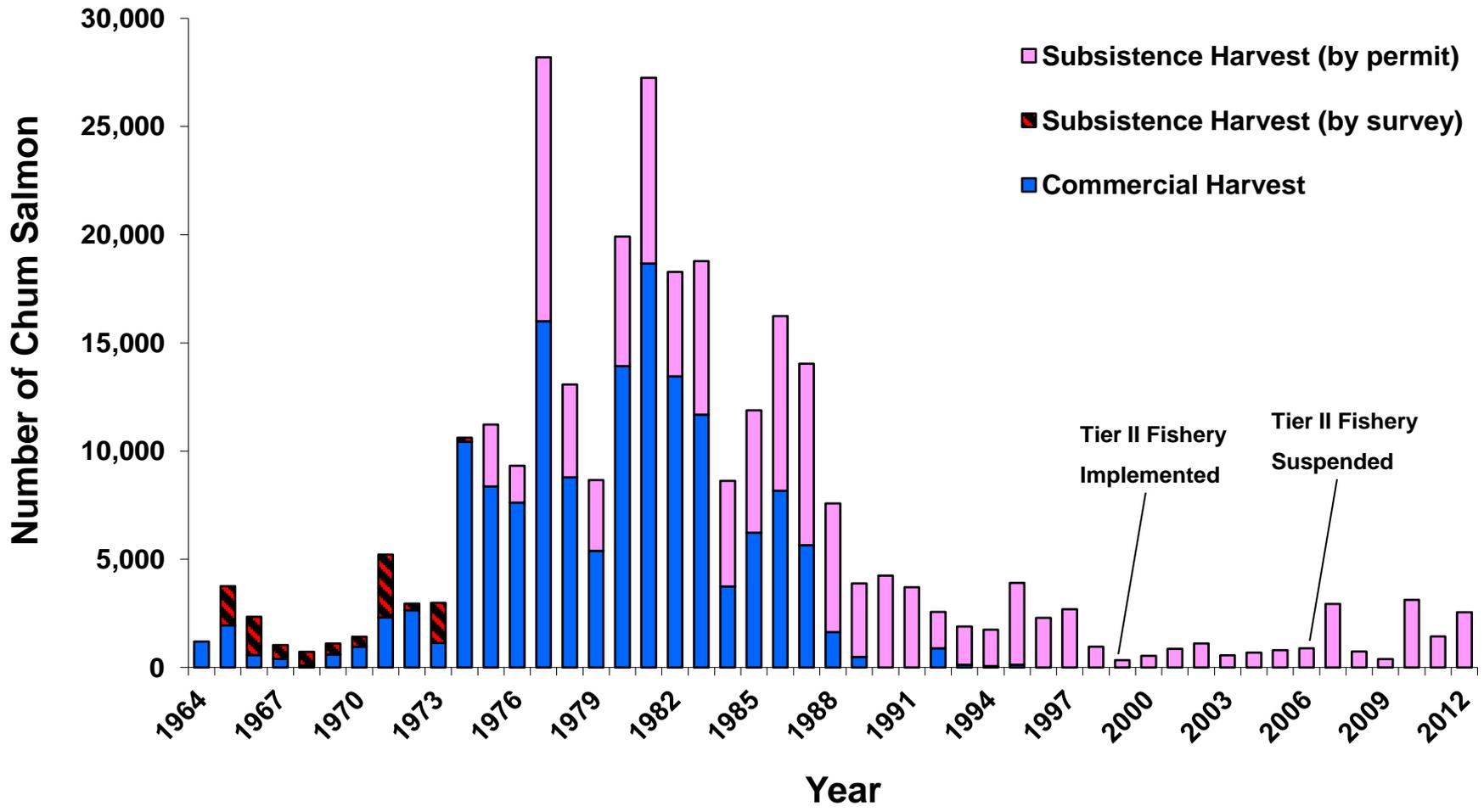
Norton Sound Commercial Salmon Fishing Districts and Subdistricts



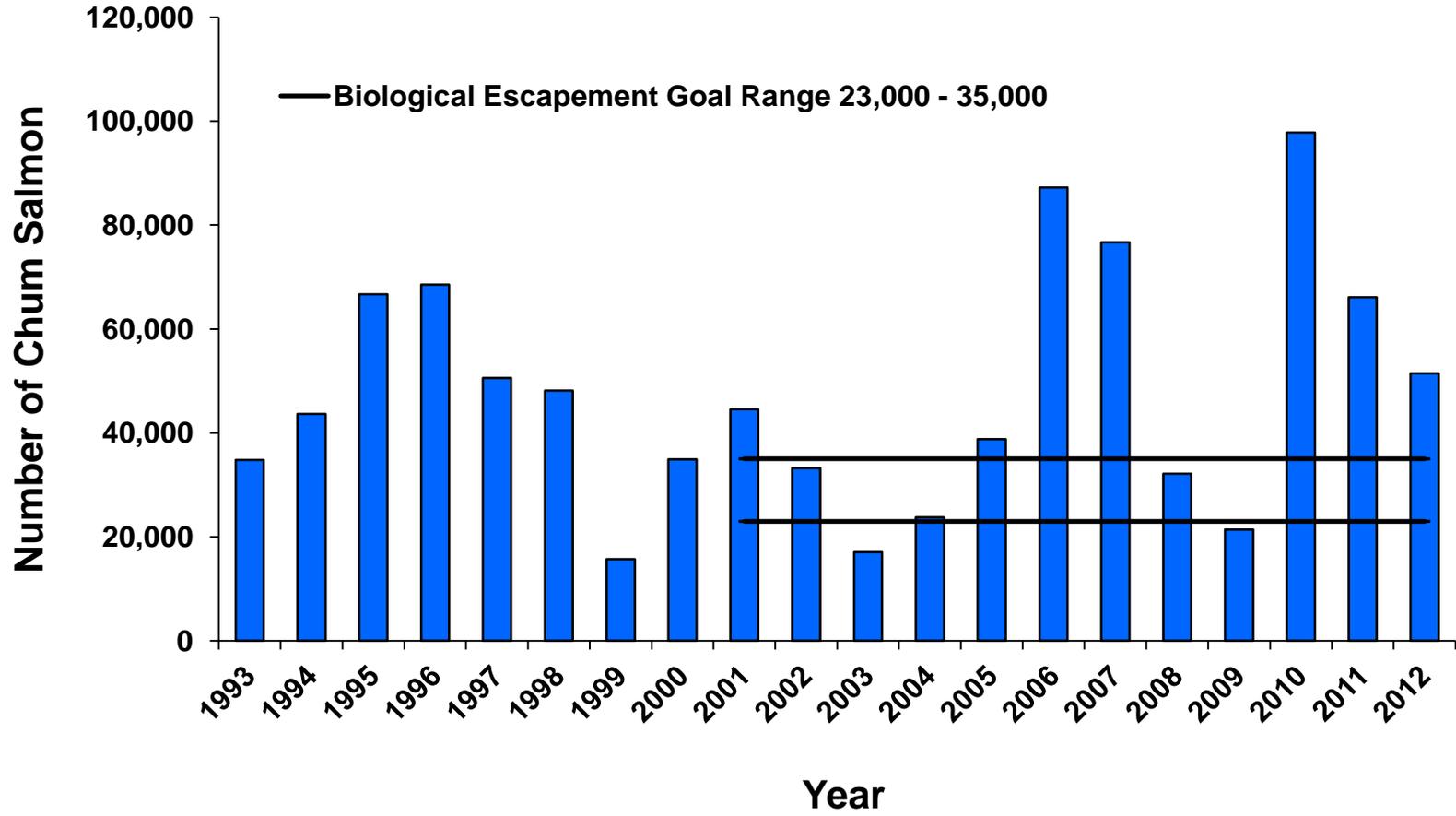
Northern Norton Sound Area Rivers



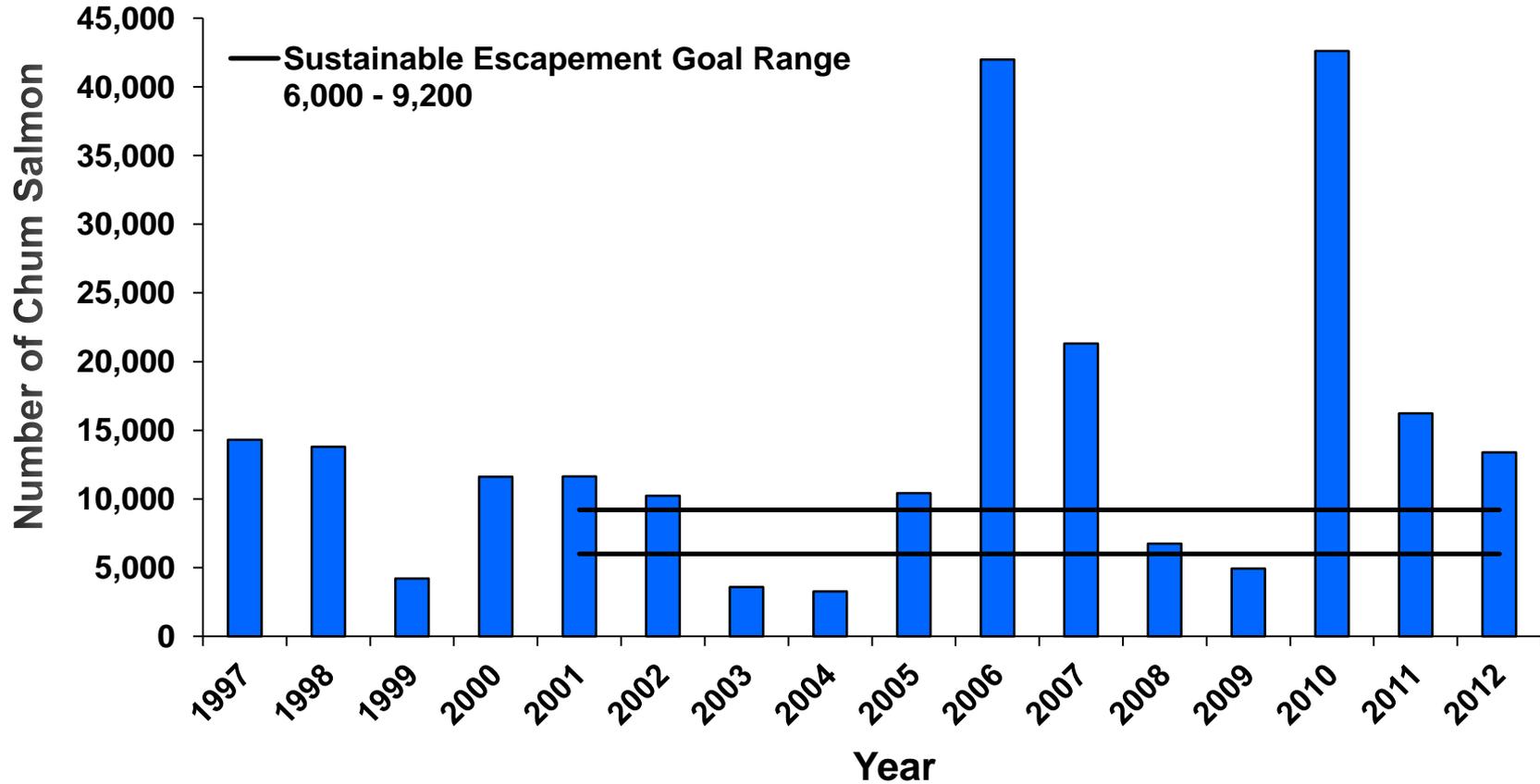
Subdistrict 1 (Nome) Chum Salmon Harvests, 1964–2012



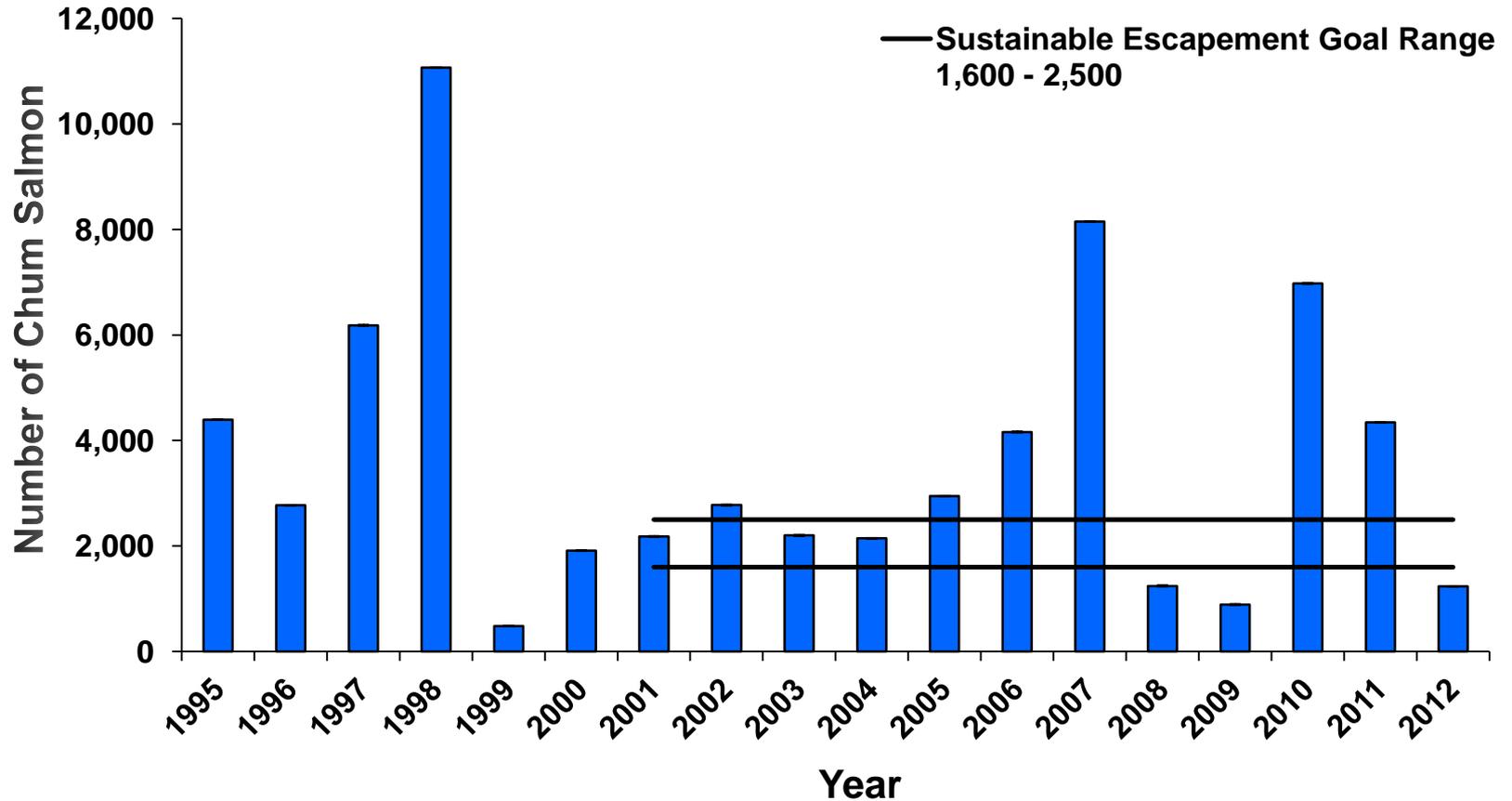
Subdistrict 1 Chum Salmon Escapements, 1993–2012



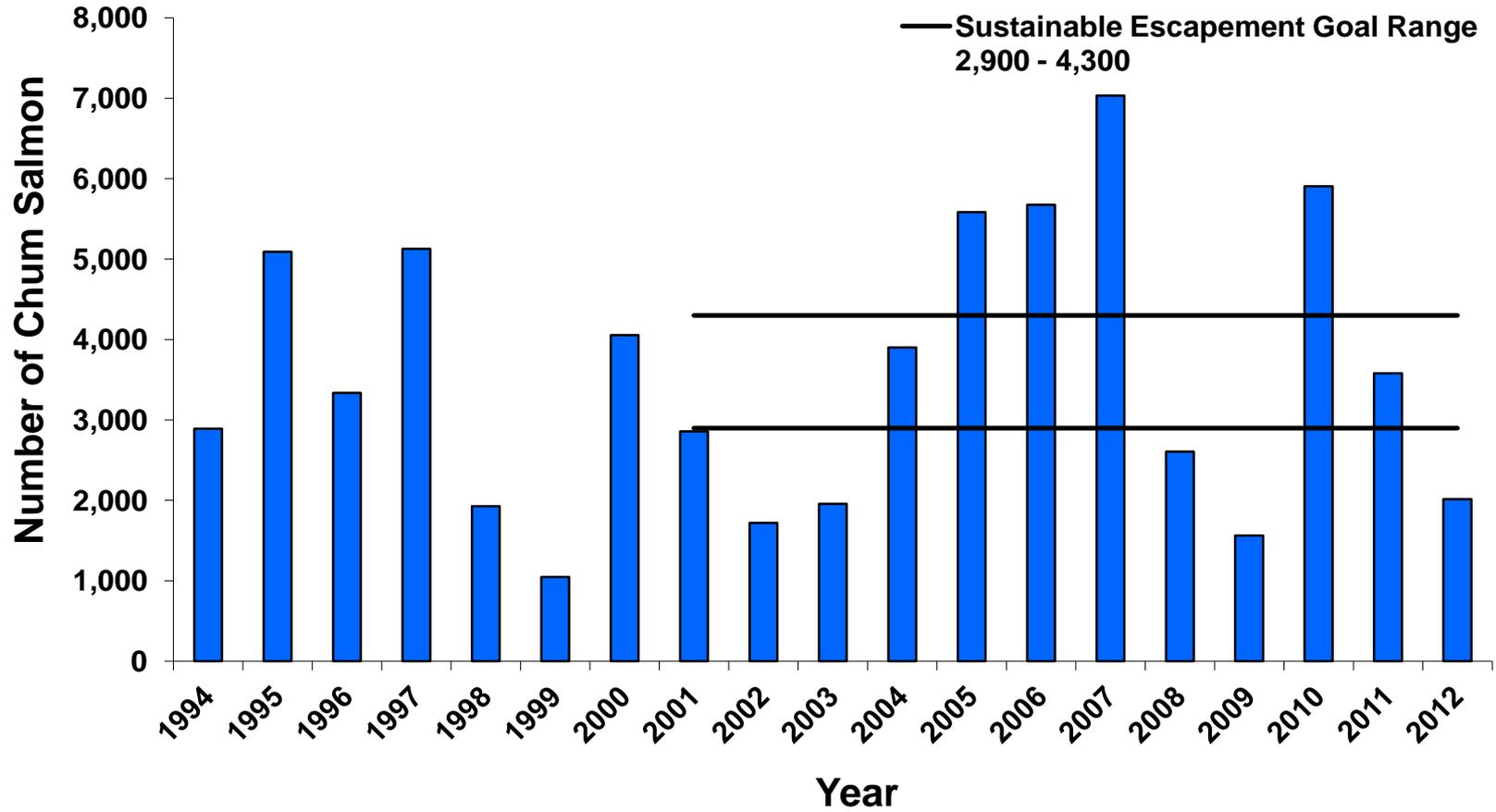
Eldorado River Chum Salmon Escapements, 1997–2012



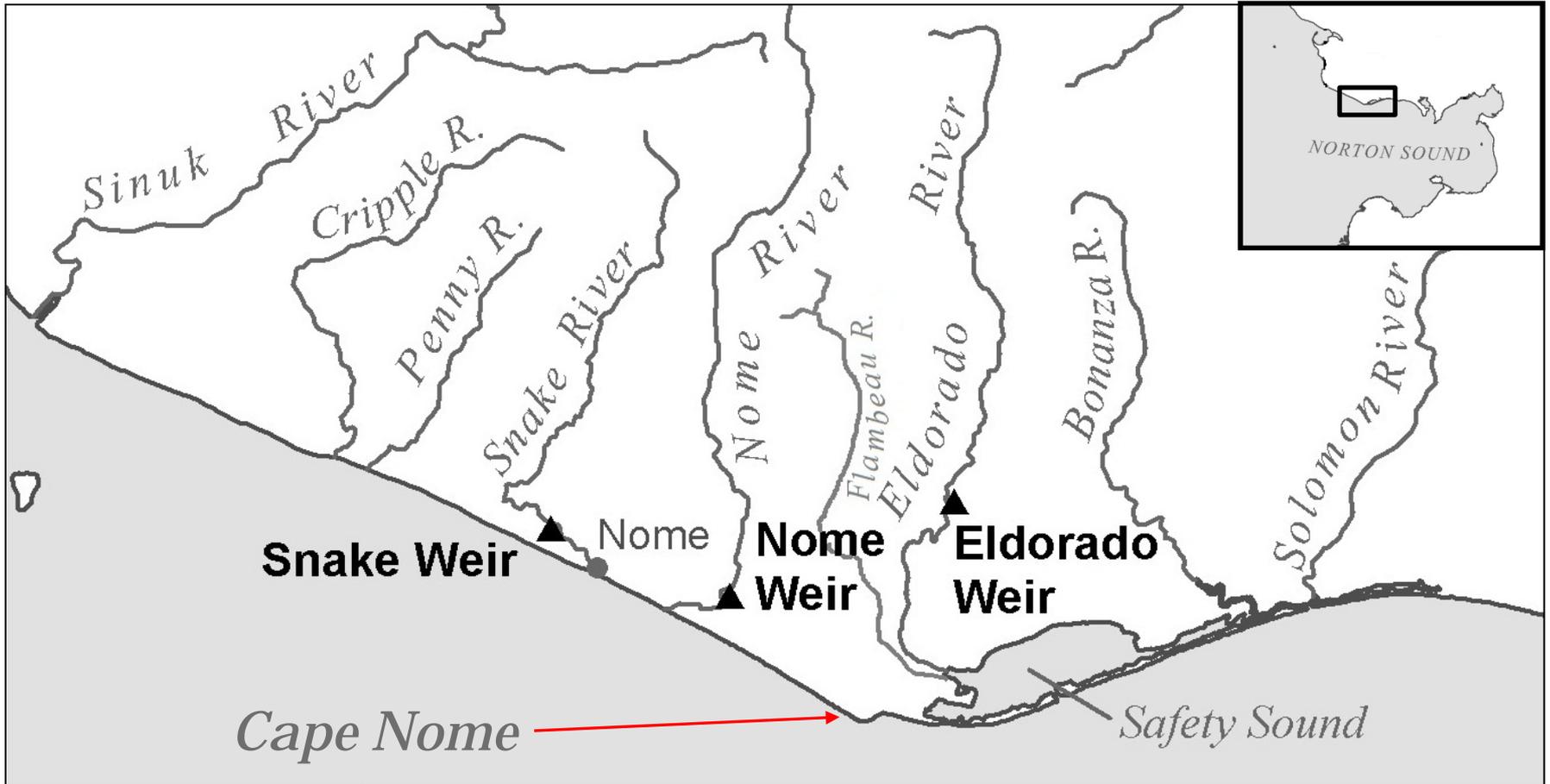
Snake River Chum Salmon Escapements, 1995–2012



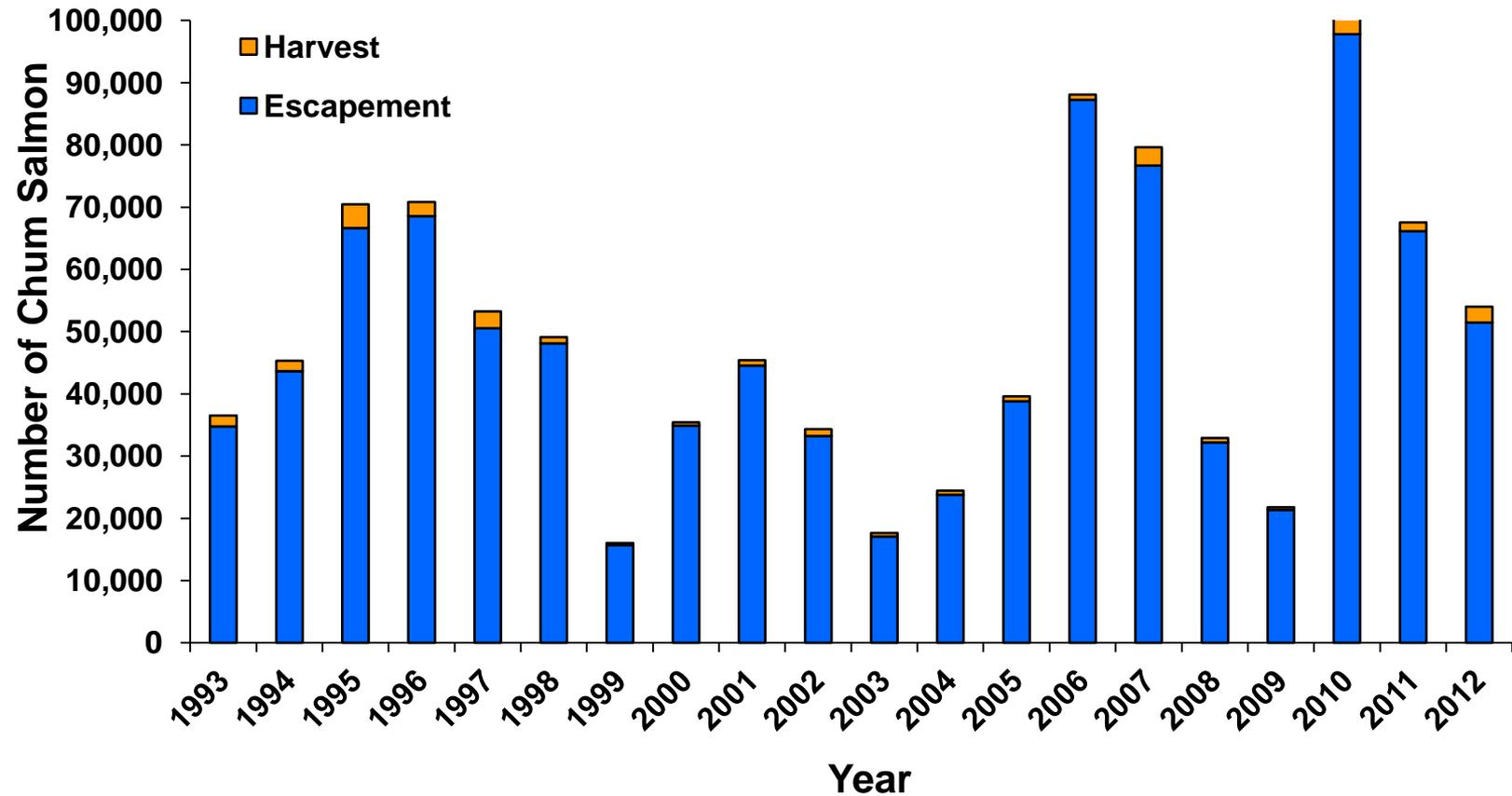
Nome River Chum Salmon Escapements, 1994–2012



Subdistrict 1

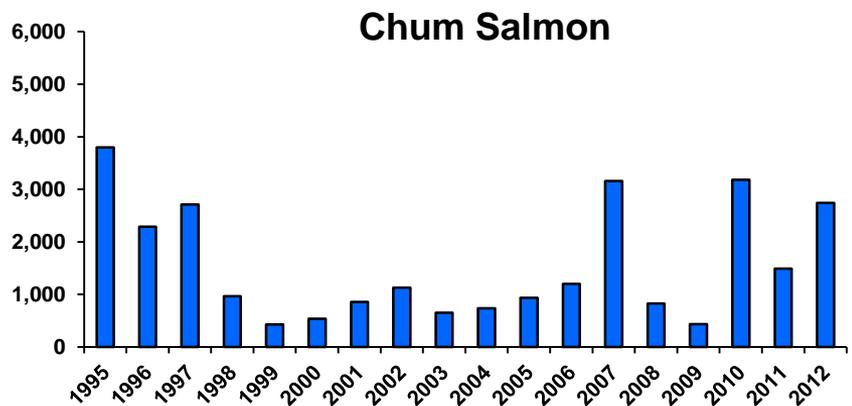
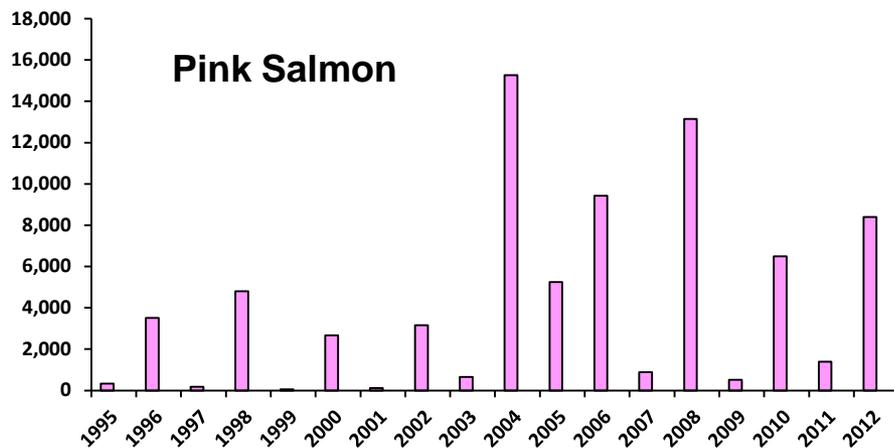
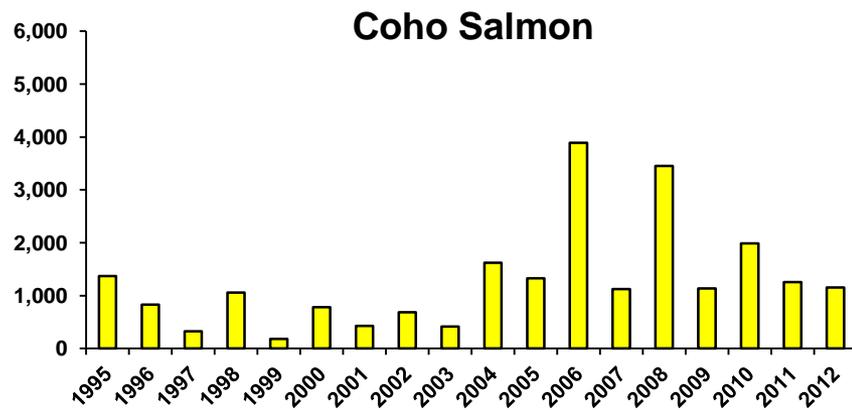
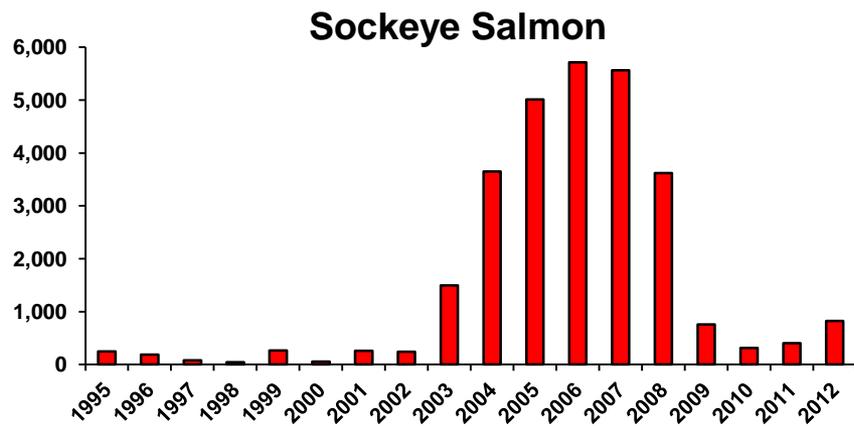


Subdistrict 1 Chum Salmon Subsistence Harvests and Escapements, 1993–2012



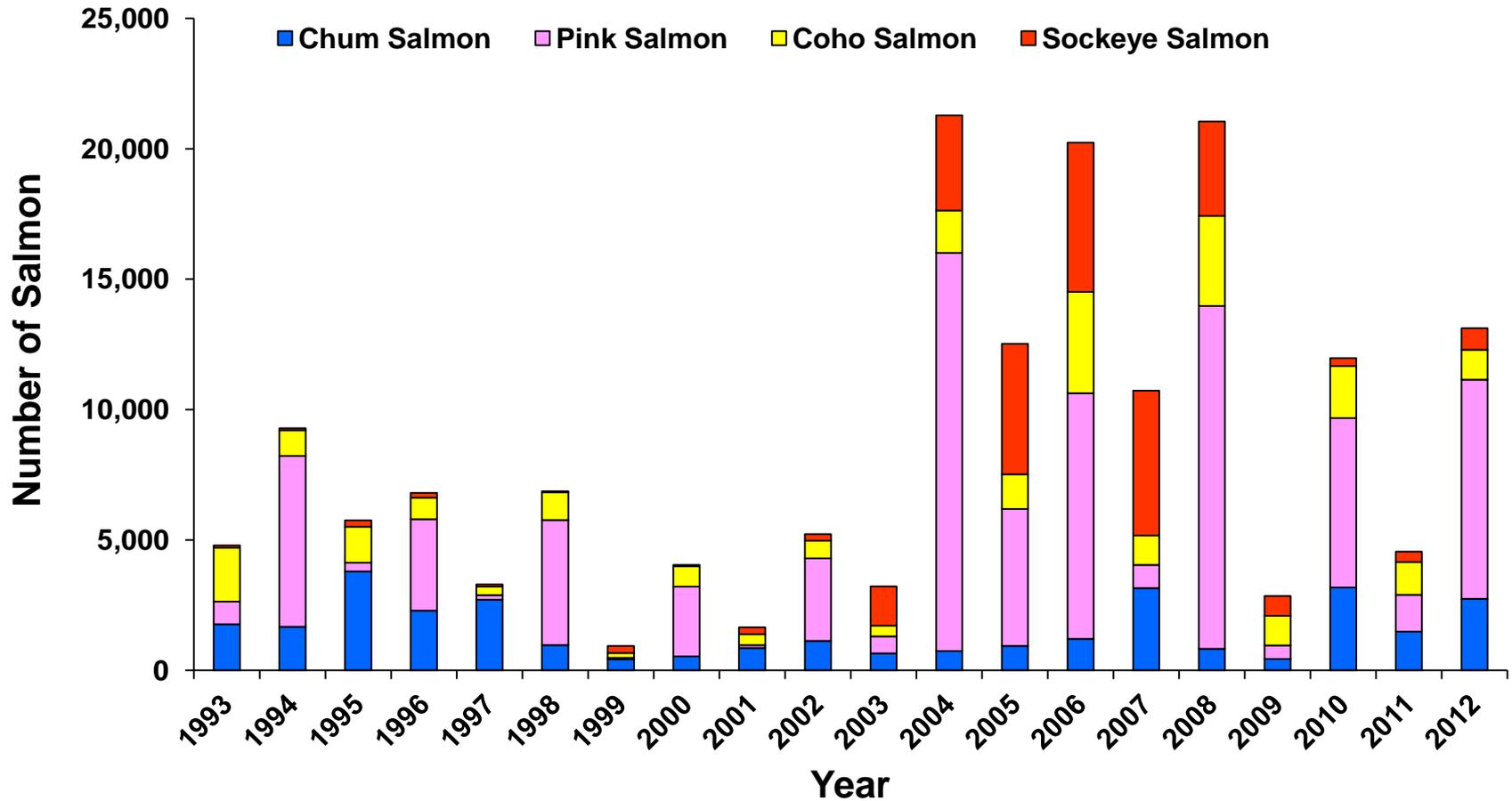
Subdistrict 1 and Pilgrim River Subsistence Sockeye, Pink, Coho, and Chum Salmon Harvests, 1995–2012

Number of Salmon



Note: Pink salmon scale is different.

Subdistrict 1 and Pilgrim River Subsistence Harvests, 1993–2012



Subdistrict 1 Chum Salmon Stock of Concern Summary

- Harvests continue to be below historical yield in Subdistrict 1.
- Subdistrict 1 escapements met in 4 of 5 years (2008–2012).
- Nome River and Snake River escapements met in 2 of 5 years.
- Tier II restrictions have not been in effect since 2005.
- Tier II restrictions are not expected in coming years.

Department Recommendation

- Continue stock of concern status for Subdistrict 1 chum salmon as yield concern.

Proposals Affecting Subdistrict 1 Salmon

Proposal 116 – Allow a commercial chum and pink fishery.

Proposal 117 – Allow commercial fishing west of Cape Nome.

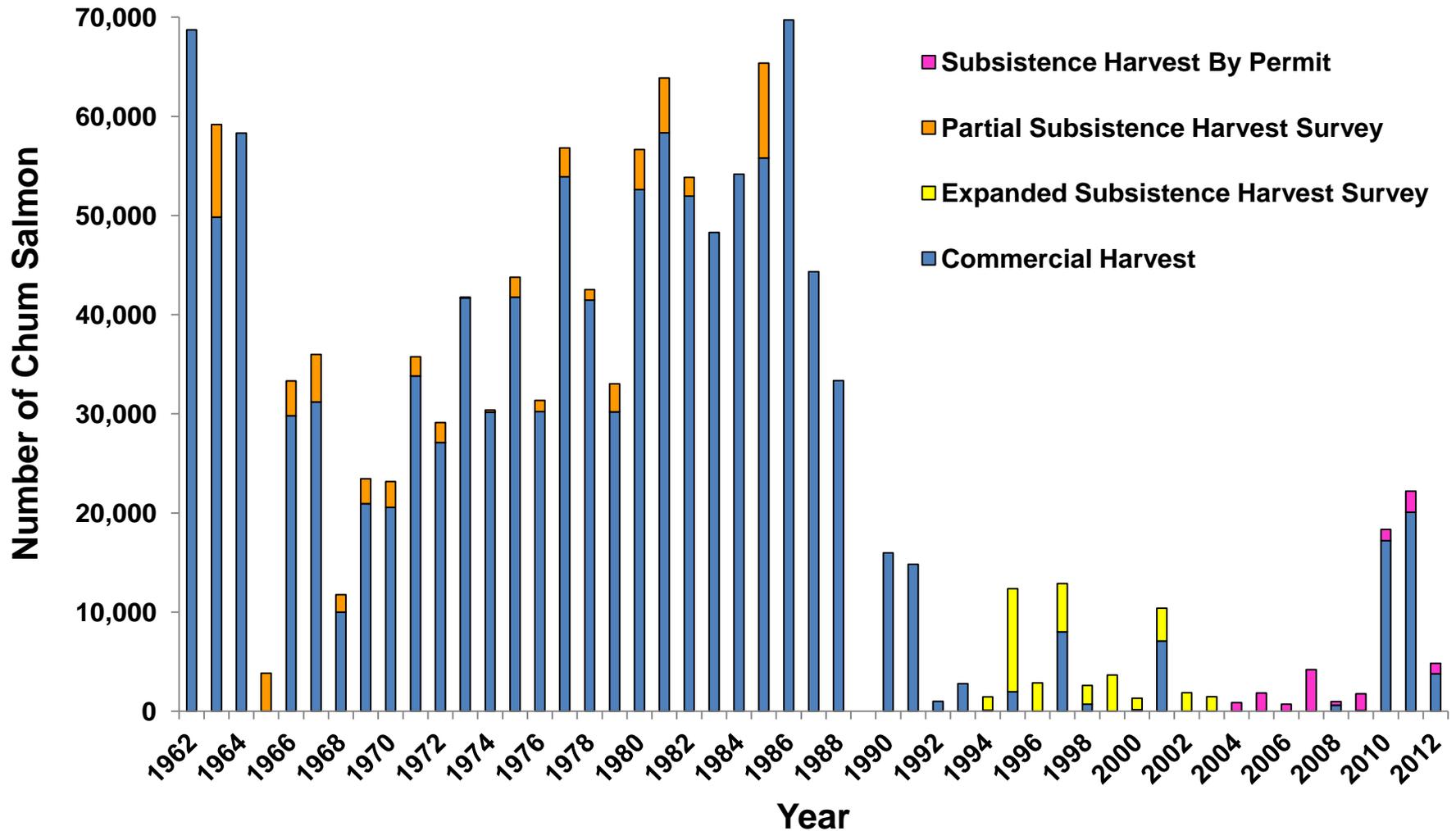
Proposal 122 – Allow subsistence gillnet fishing at any time.

Proposal 123 – Allow subsistence fishing with beach seines without an emergency order being necessary.

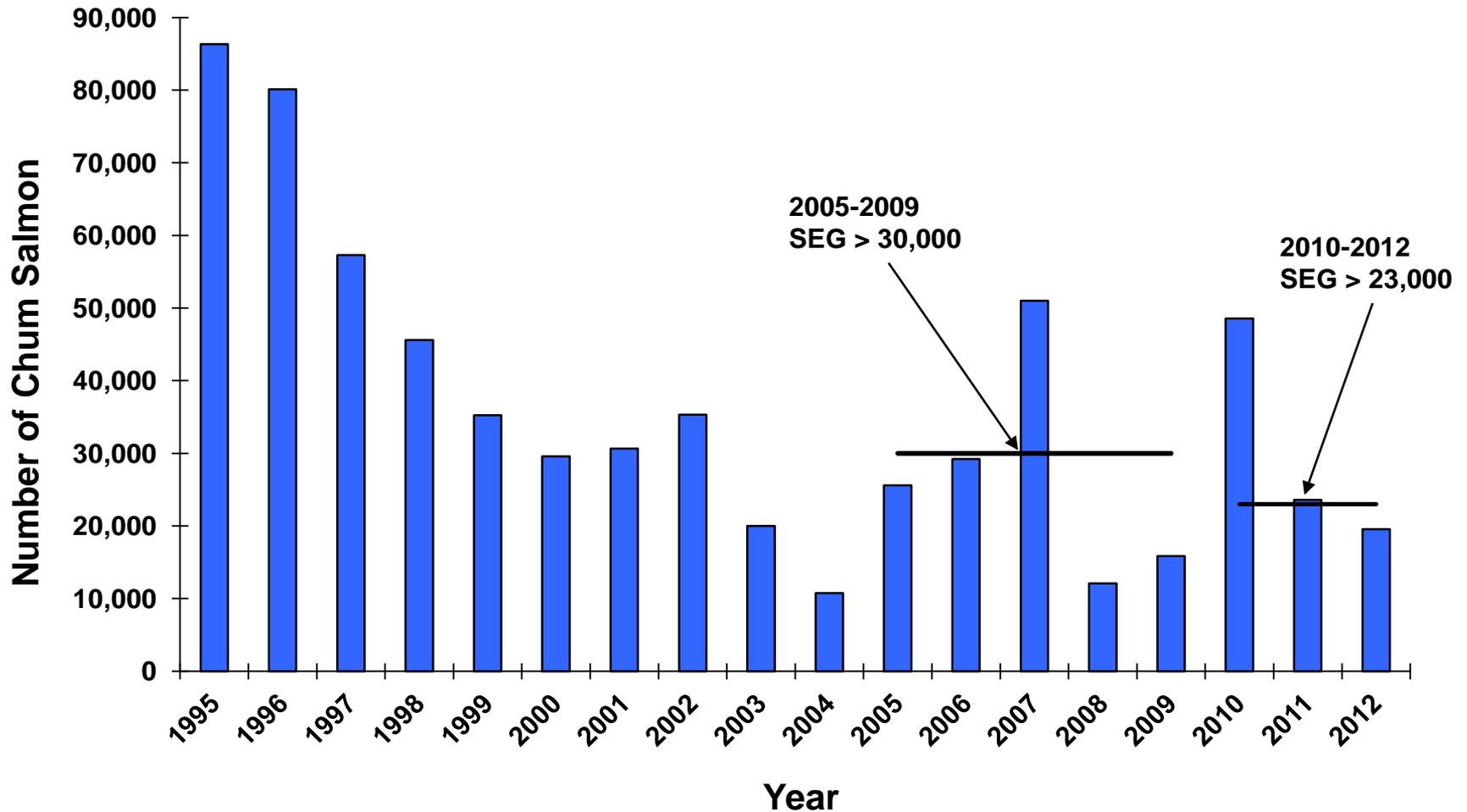
Proposal 124 – Expand subsistence fishing area farther upriver in Sinuk River.

Proposal 129 – Re-open chum salmon sport fishing.

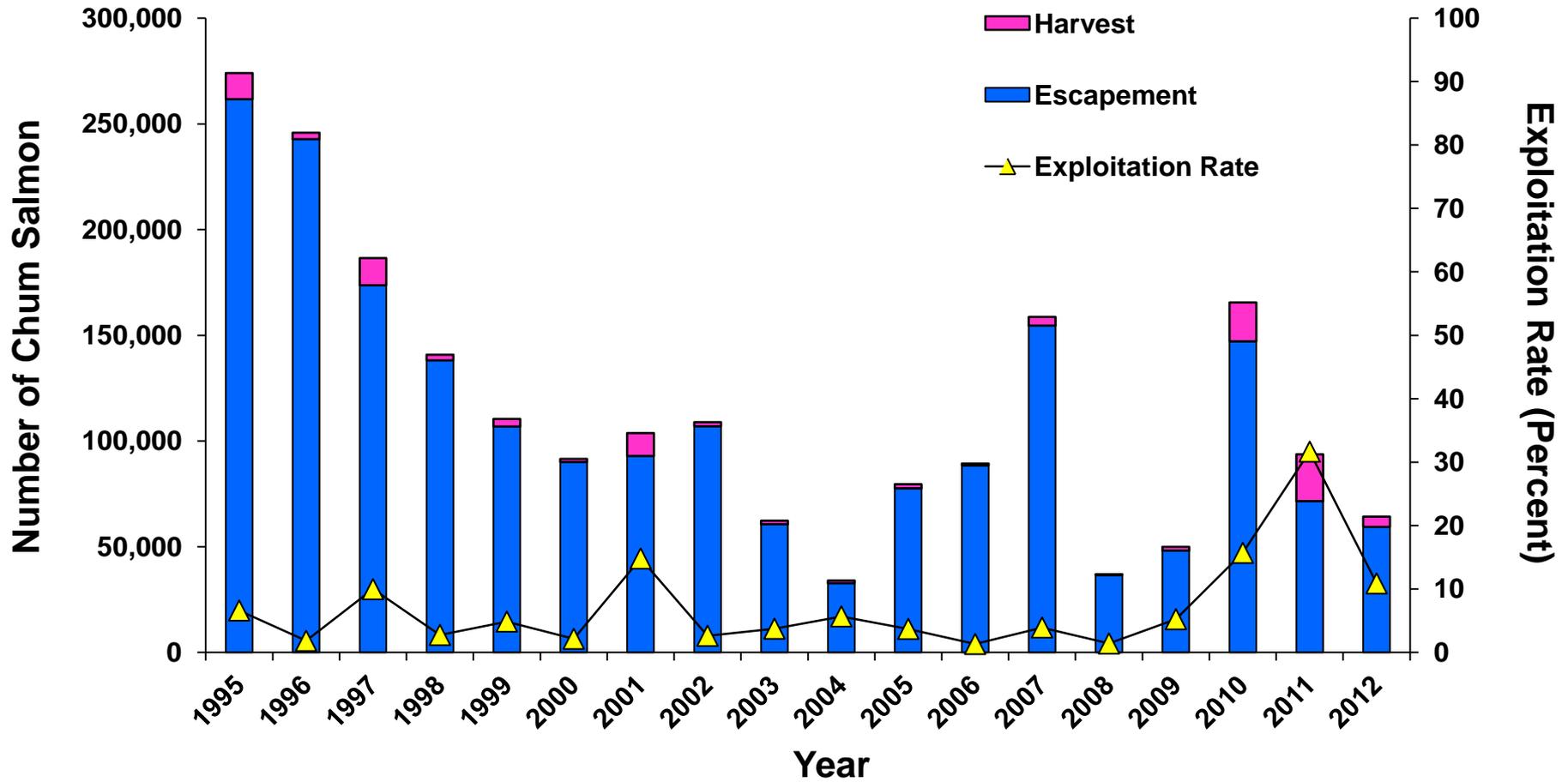
Subdistrict 2 Commercial and Subsistence Chum Salmon Harvests, 1962–2012



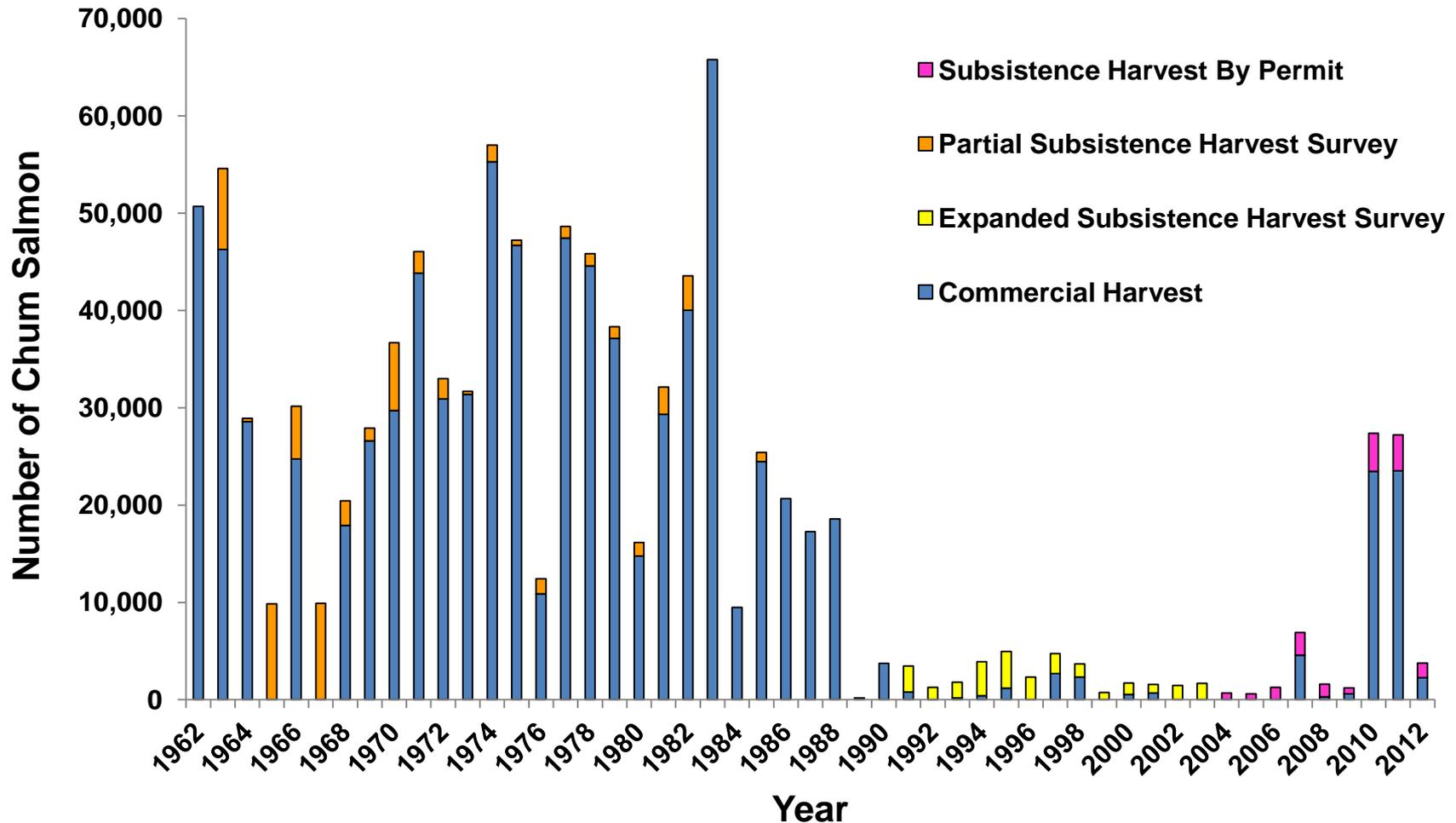
Niukluk River Chum Salmon Escapements, 1995–2012



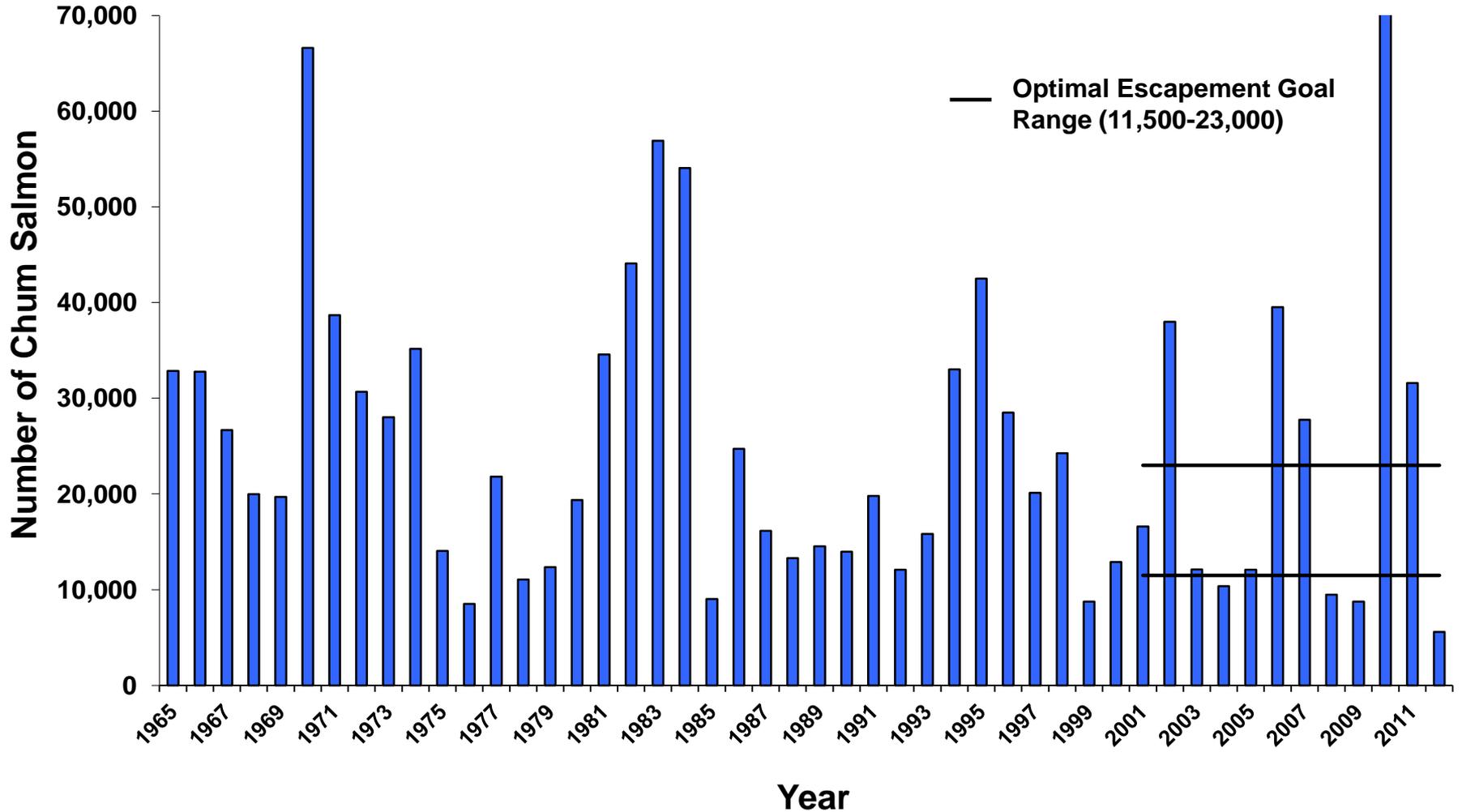
Chum Salmon Total Run Size and Exploitation Rate, Fish River Drainage, Subdistrict 2, 1995–2012



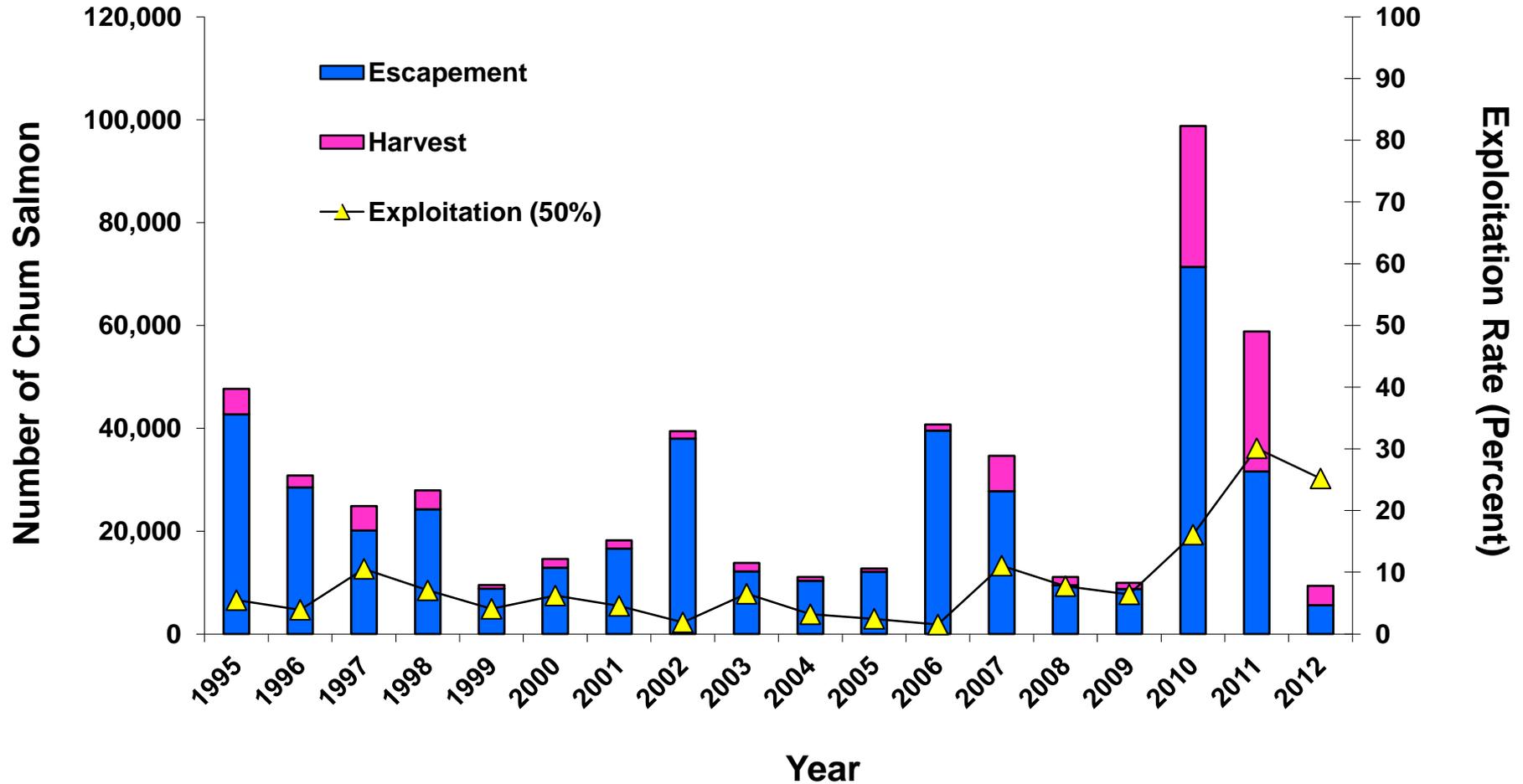
Subdistrict 3 Commercial and Subsistence Chum Salmon Harvests, 1962–2012



Kwiniuk River Chum Salmon Escapements, 1965–2012



Chum Salmon Total Run Size and Exploitation Rate, Kwiniuk River, Subdistrict 3, 1995–2012



Subdistricts 2 and 3 Chum Salmon Stock of Concern Summary

- Harvests continue to be below historical yield in subdistricts 2 and 3
- Escapements have been reached in 2 of 5 years at Niukluk River in Subdistrict 2
- Escapements have been reached in 2 of 5 years at the Kwiniuk River in Subdistrict 3

Department Recommendation

- Continue the designation of Norton Sound subdistricts 2 and 3 chum salmon as a yield concern.

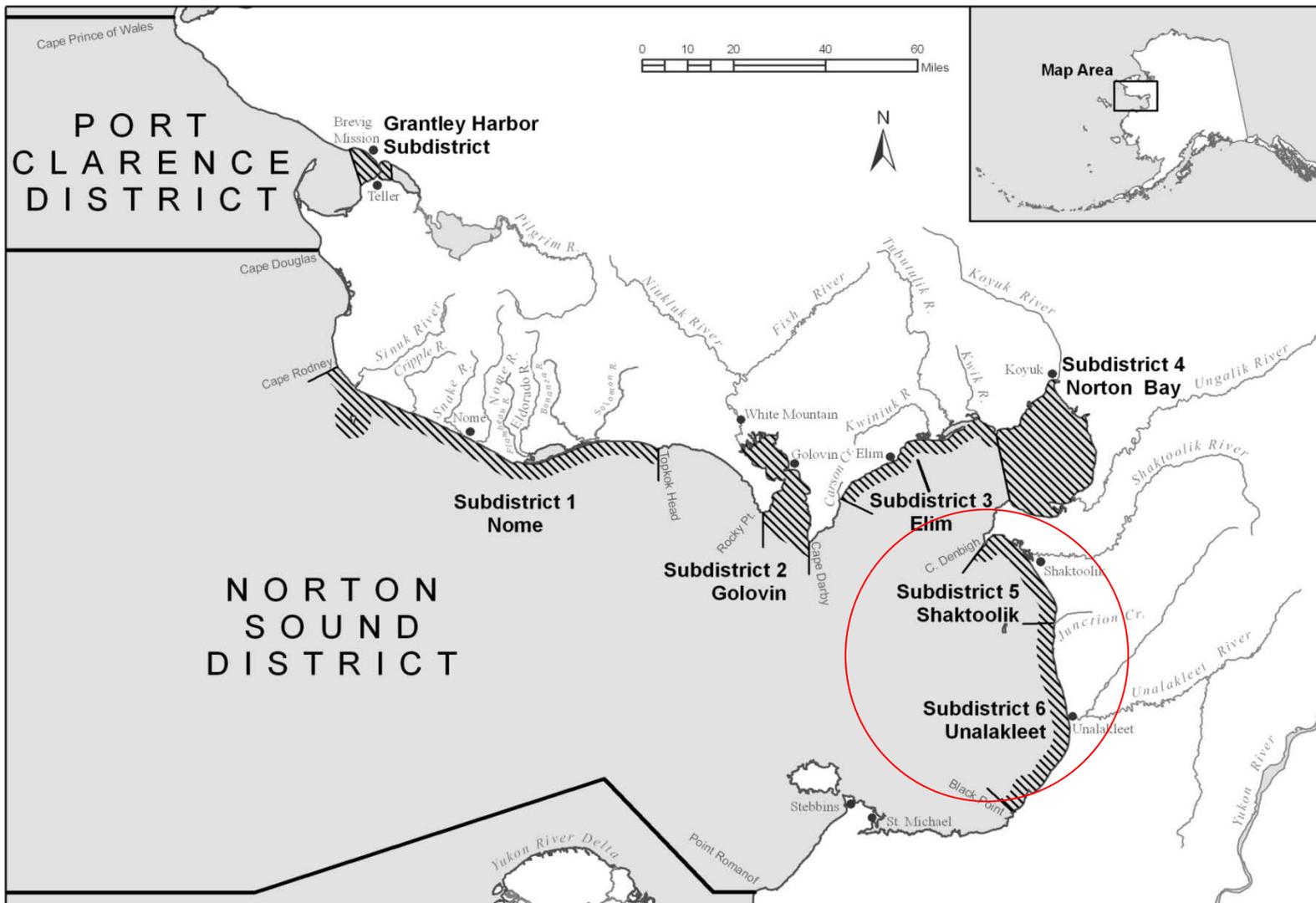
Proposals Affecting Subdistricts 2 and 3 Salmon

Proposal 118 – Allow a commercial coho salmon fishery in Subdistrict 2 only after 4,800 coho have passed Niukluk River tower (escapement goal is now 2,400–7,200 coho).

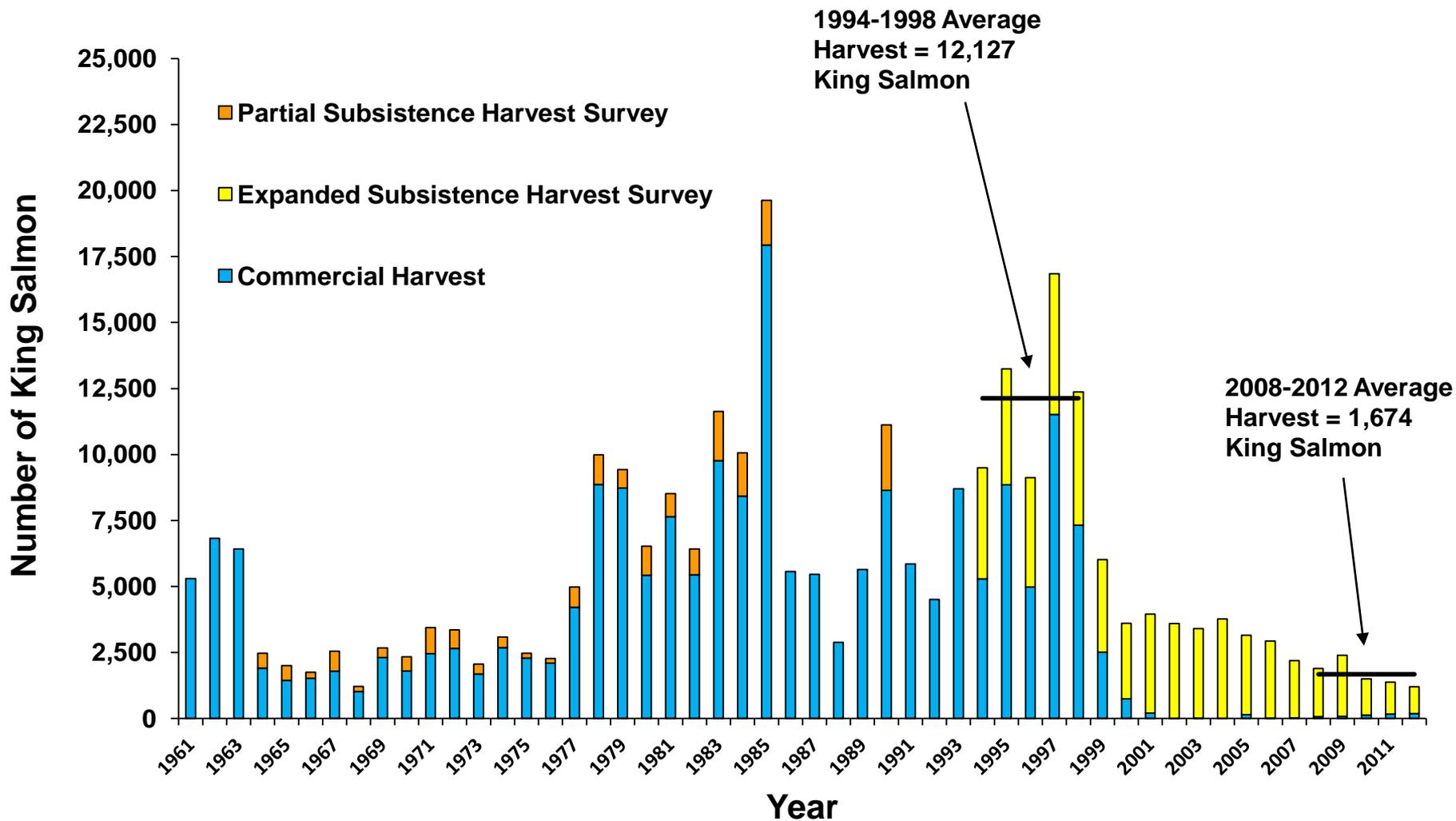
Proposal 119 – Allow a commercial coho salmon fishery only when not affecting chum salmon escapement goals.



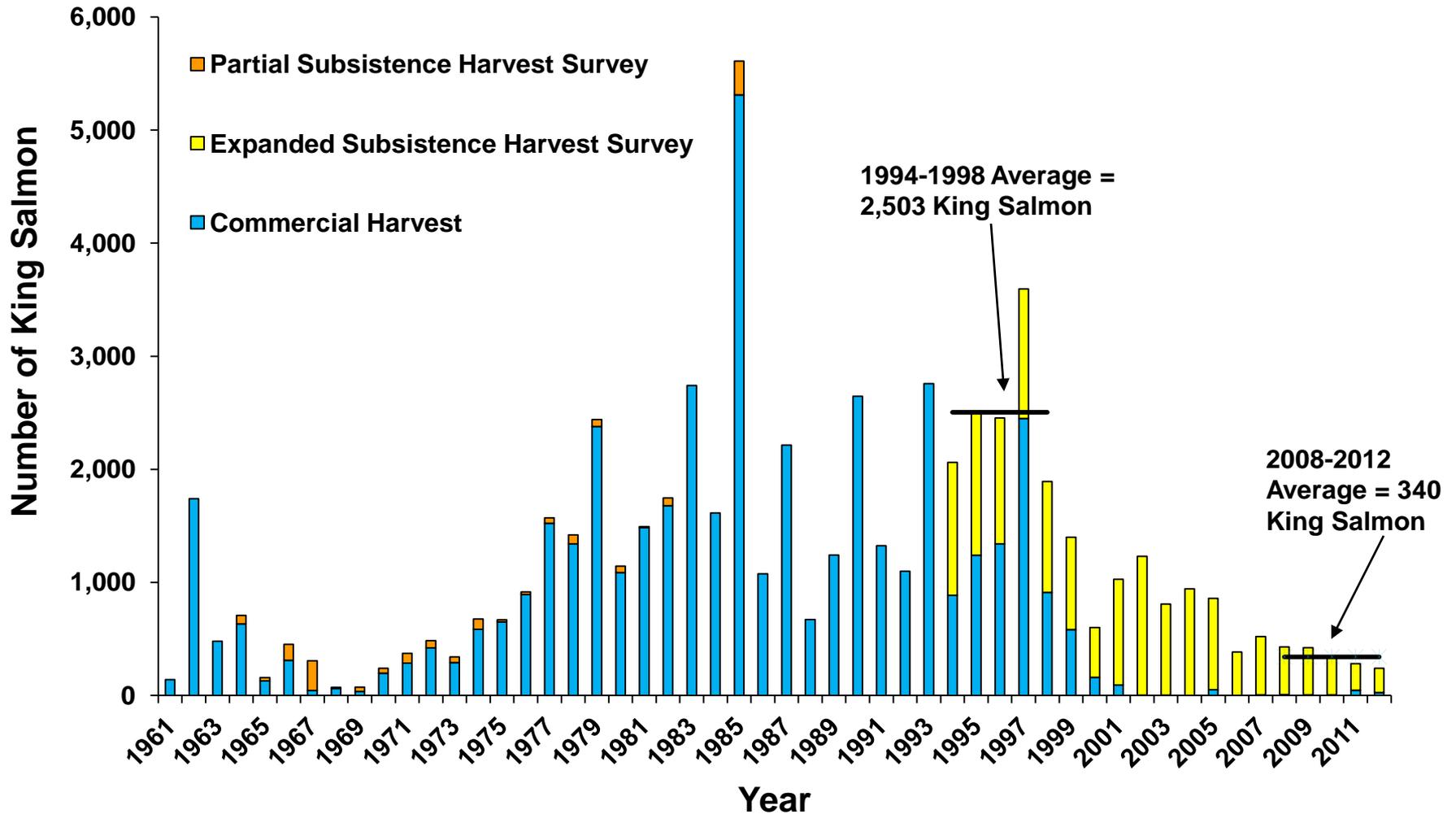
Norton Sound Commercial Salmon Fishing Districts and Subdistricts



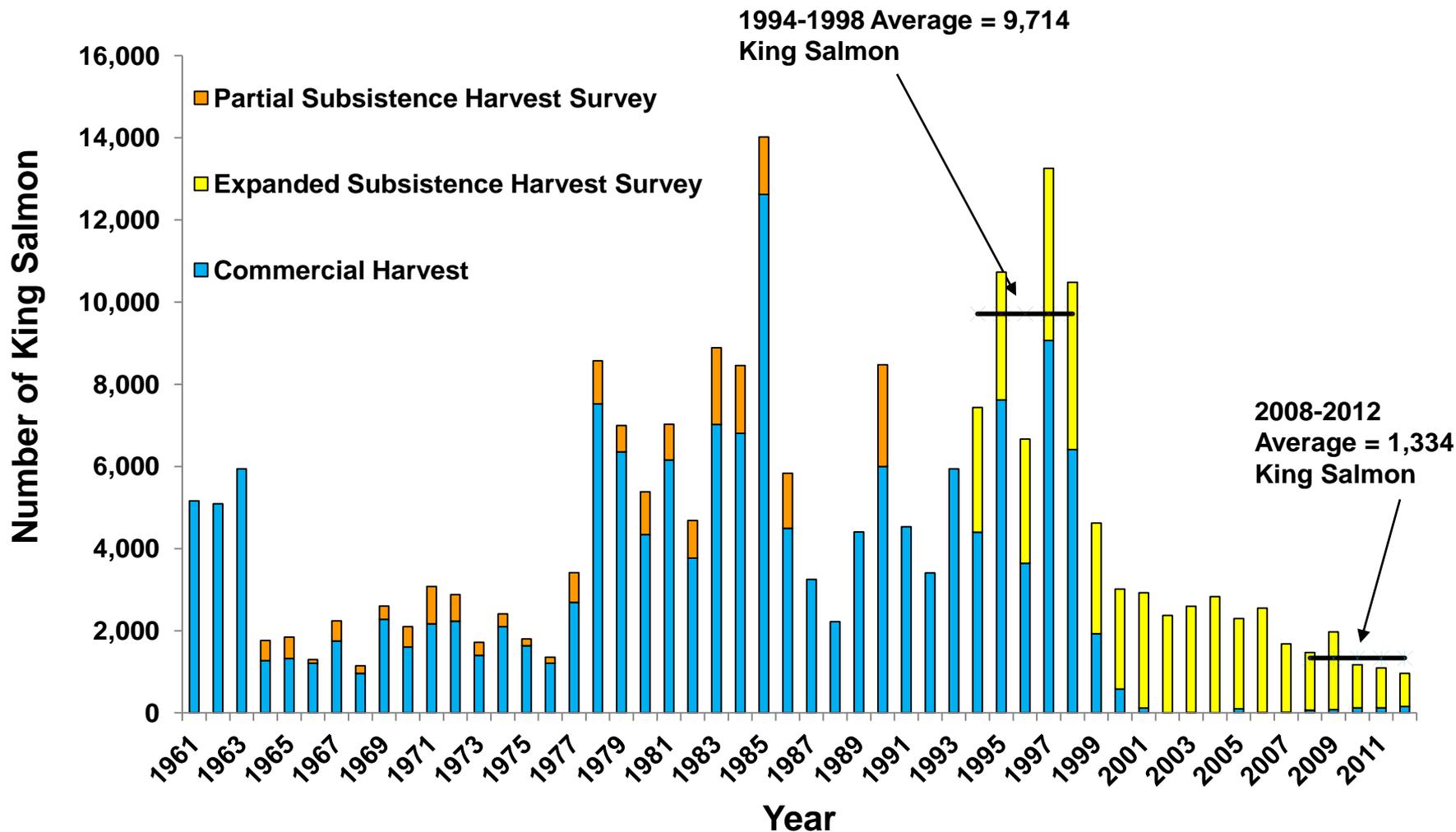
Subdistricts 5 (Shaktoolik) and 6 (Unalakleet) Commercial and Subsistence King Salmon Harvests, 1961–2012



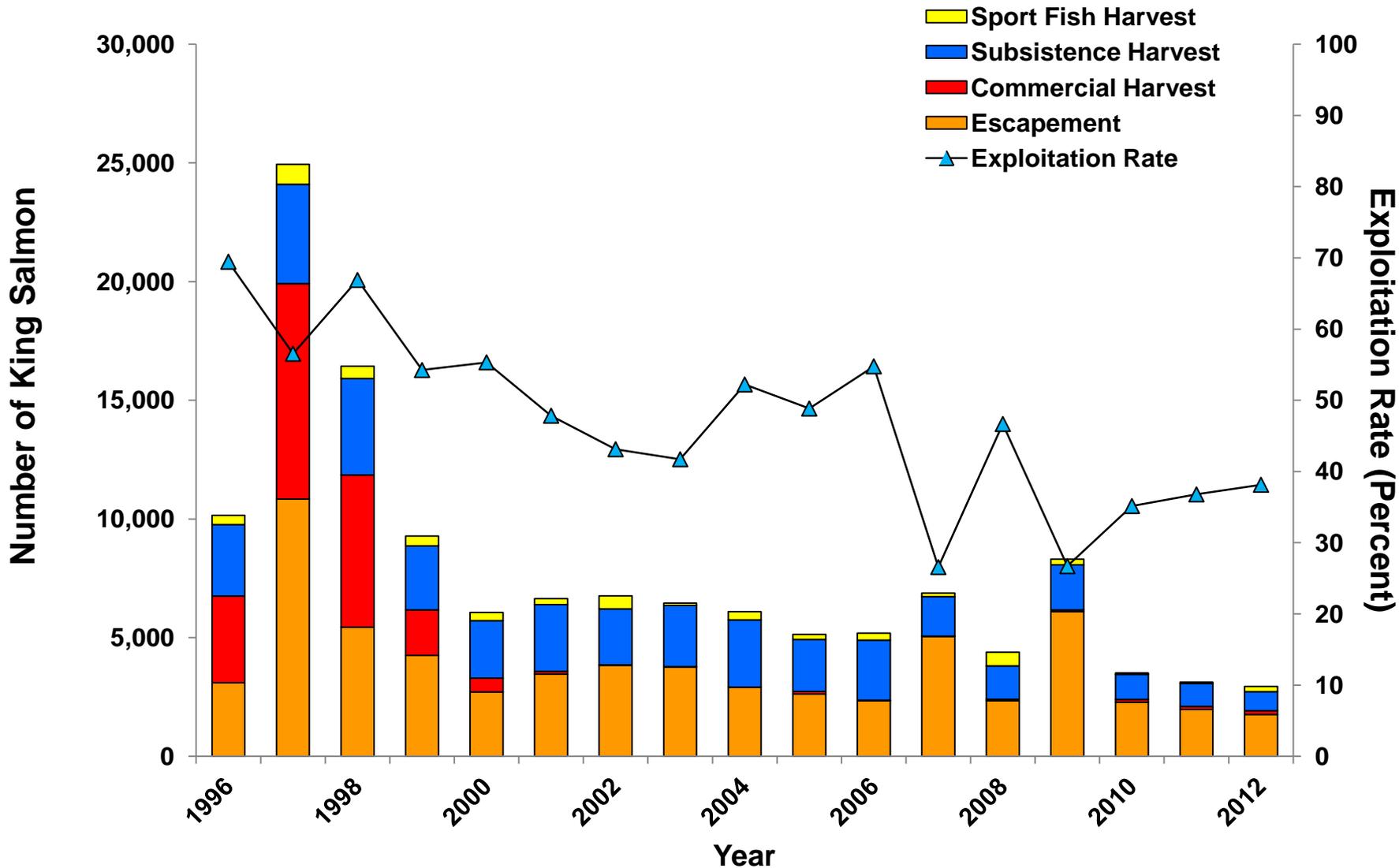
Shaktoolik (Subdistrict 5) Commercial and Subsistence King Salmon Harvests, 1961–2012



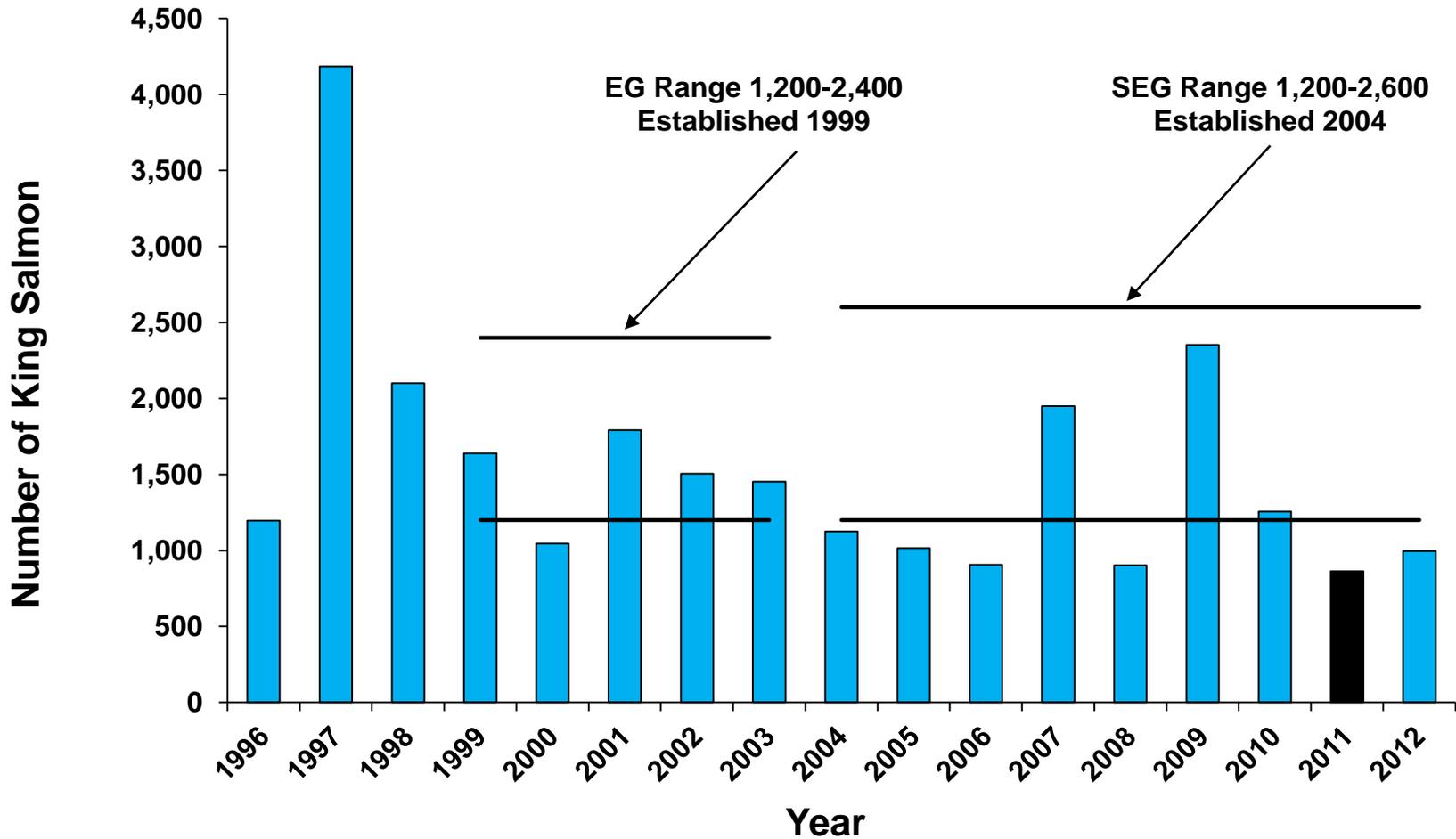
Unalakleet (Subdistrict 6) Commercial and Subsistence King Salmon Harvests, 1961–2012



Unalakleet River King Salmon Total Run Size and Exploitation Rate, 1996–2012



North River Tower King Salmon Escapements, 1996–2012



Note: 2011 tower count is considered an incomplete estimate of escapement because of poor counting conditions.

Subdistricts 5 and 6 King Salmon Stock of Concern Summary

- King salmon runs declined in 2000s.
- Escapements goals have been reached in 2 of the previous 5 years.
- King salmon escapements have been met only with increased restrictions on fisheries.

Department Recommendation

- Continue as a yield concern.

Proposals Affecting Subdistricts 5 and 6 Salmon

Proposal 120 – Allow commercial chum and pink salmon fishing before July 1.

Proposal 121 – Allow subsistence fishing with beach seines.



Acknowledgements

Norton Sound Economic Development Corporation

AYK Sustainable Salmon Initiative

Sitnasuak Native Corporation

Unalakleet Native Corporation

Elim Native Corporation

Council Native Corporation

Bering Straits Native Corporation

Kawerak

Native Village of Unalakleet

U.S. National Park Service, Fish & Wildlife Service, and BLM

THE END OF THE TRAIL



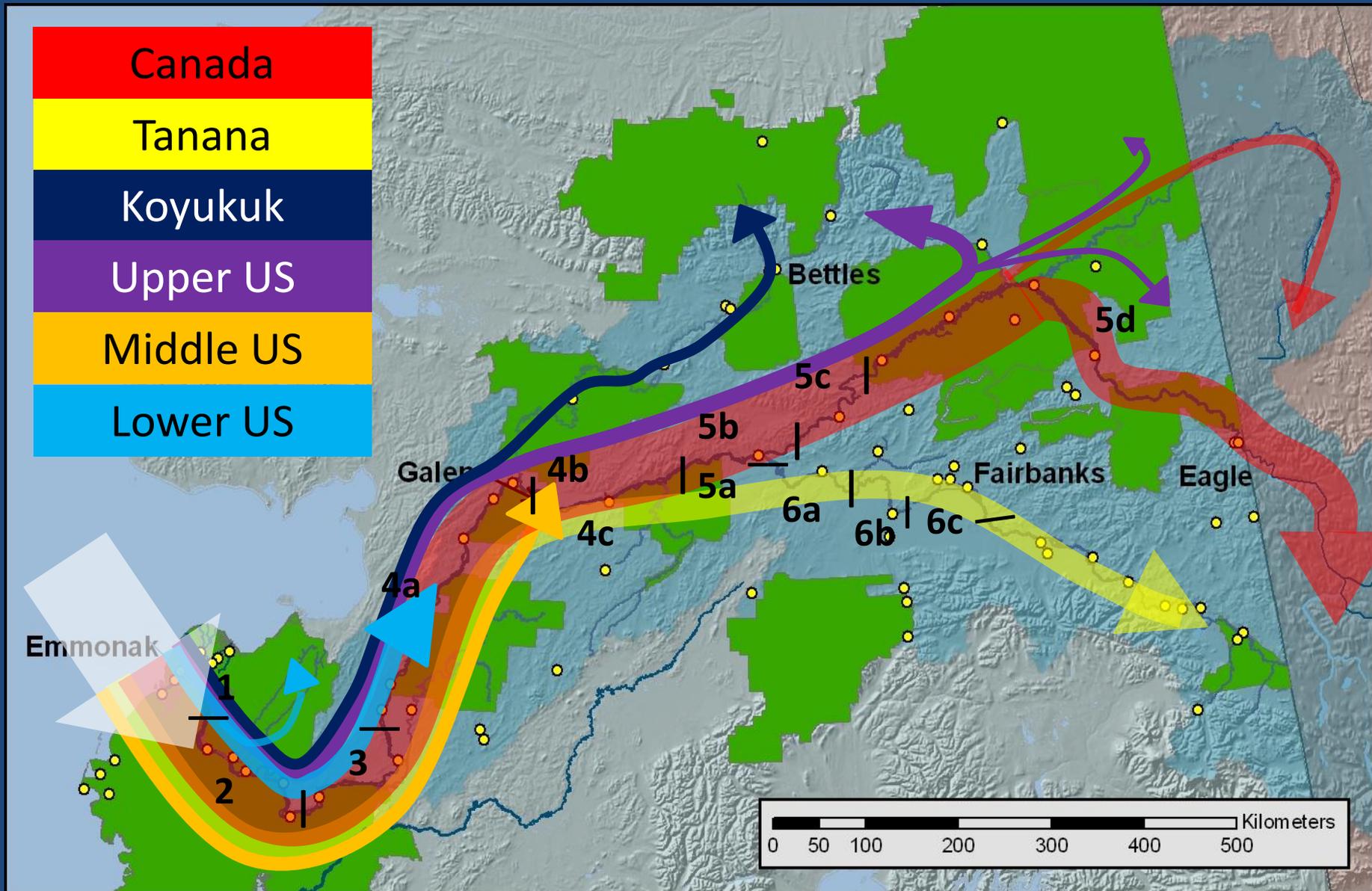
Yukon River King Salmon Stock of Concern and Summer Chum Salmon Fishery

AYK Board of Fisheries Meeting
January 2013

Presentation by:
Dr. Stephanie Schmidt

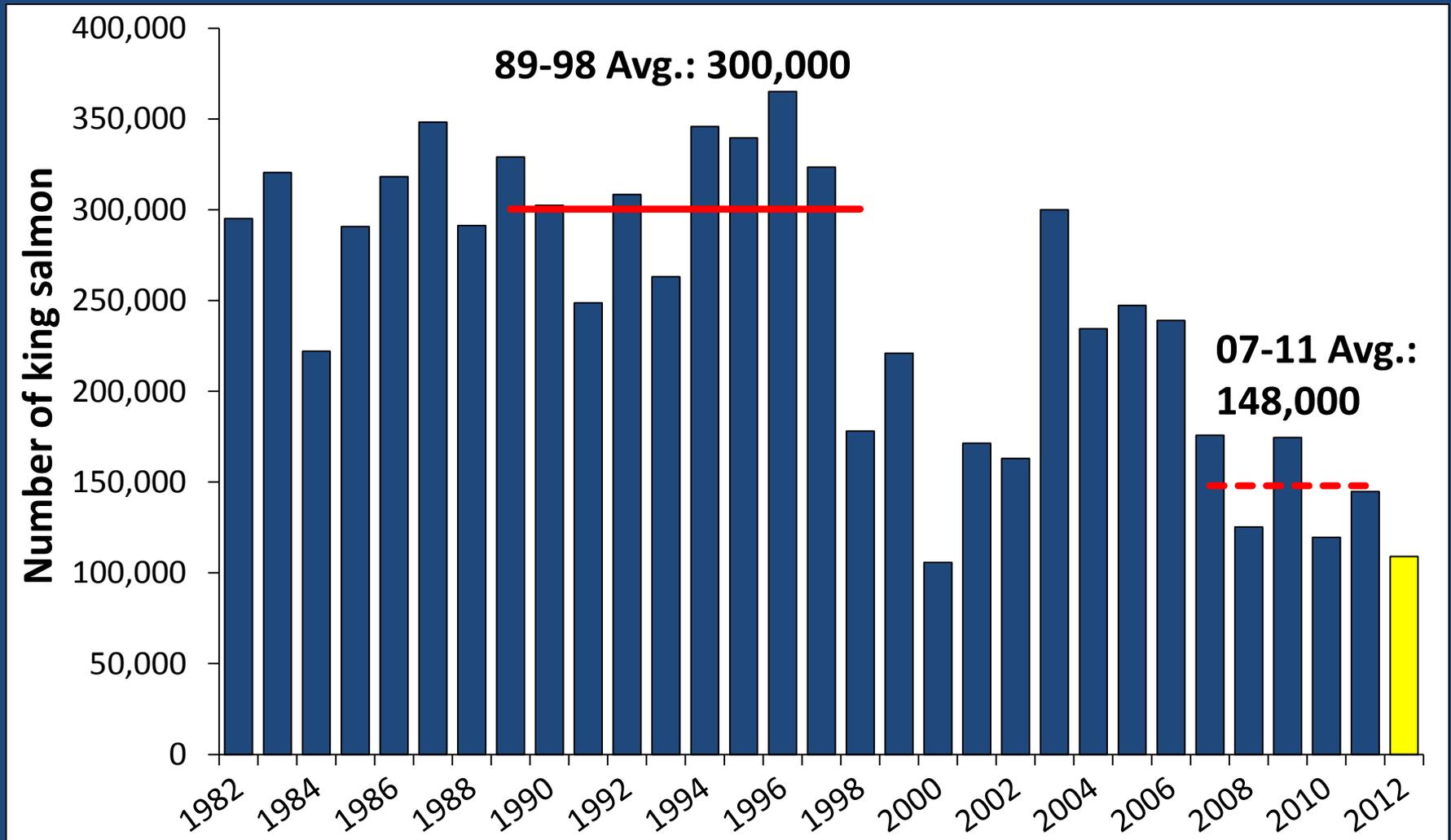


Oral Report – RC-7, Tab-6
King and Summer Chum Written Report – RC-3, Tab-6



Map courtesy of USFWS

Historical estimated total drainagewide king salmon run



Preseason run size projection and management planning

- Outlook derived from a combination of population models – Ricker (spawners/recruits) and sibling models.

Preseason run size projection and management planning

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- Preseason management planning meetings facilitated by YRDFA.
 - Involve the public to develop strategies to respond to low runs.

Preseason run size projection and management planning

- Outlook derived from a combination of population models – Ricker (spawners/recruits) and sibling models.
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- Initial management is based on the preseason projection and plan.

Preseason run size projection and management planning

- Outlook derived from a combination of population models – Ricker (spawners/recruits) and sibling models.
- Preseason management planning meetings facilitated by YRDFA.
 - Involves the public to develop strategies to respond to low runs.
- Initial management is based on the preseason projection and plan.
- As the run develops, in-season run assessment is used to guide management decisions.

In-season run assessment indicators

In-season run assessment indicators:

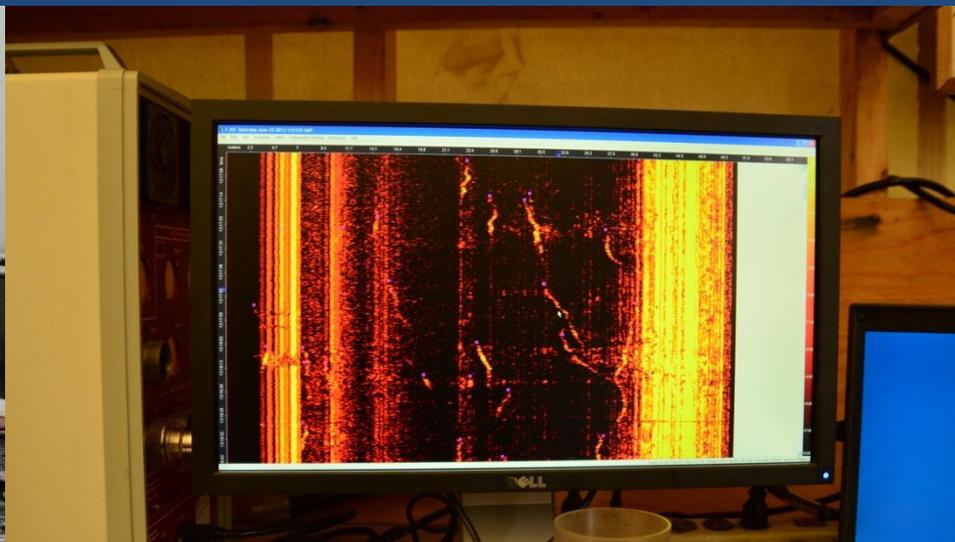
Test fishing



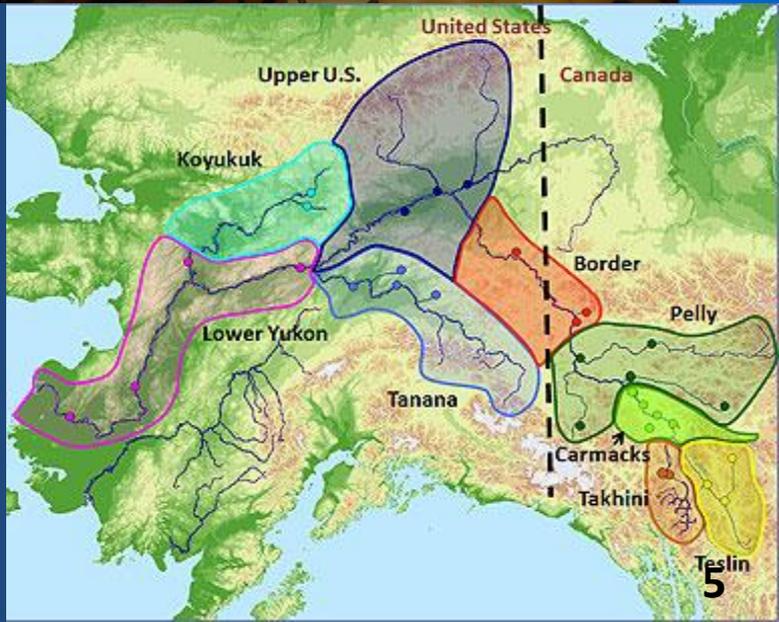
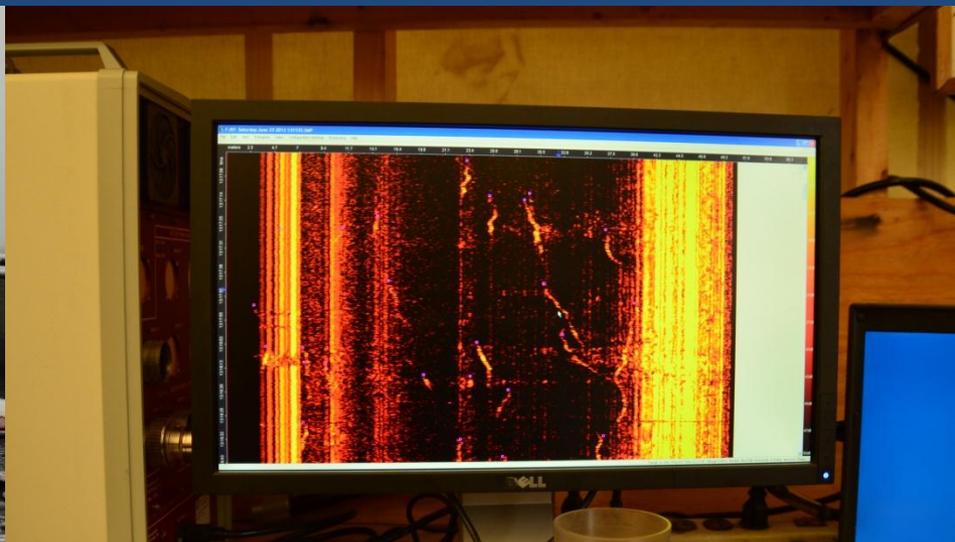
In-season run assessment indicators: Age, sex, length (ASL) composition



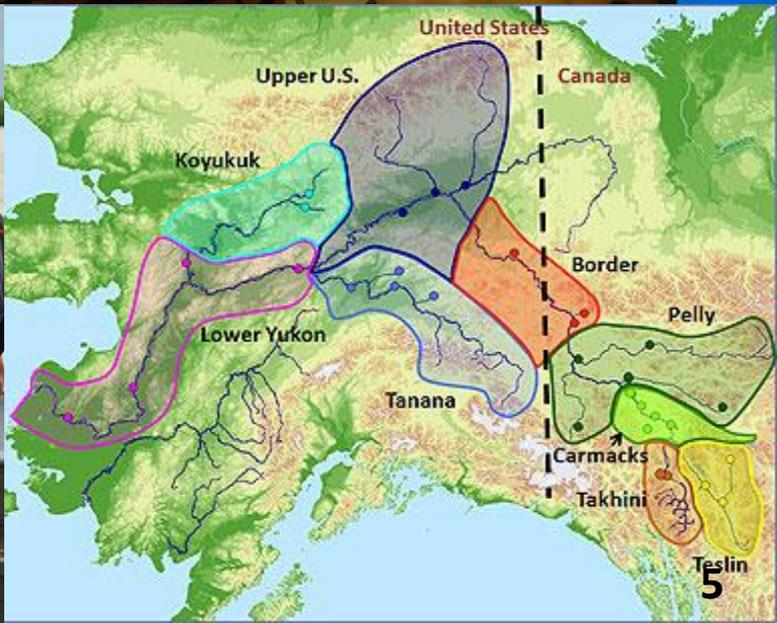
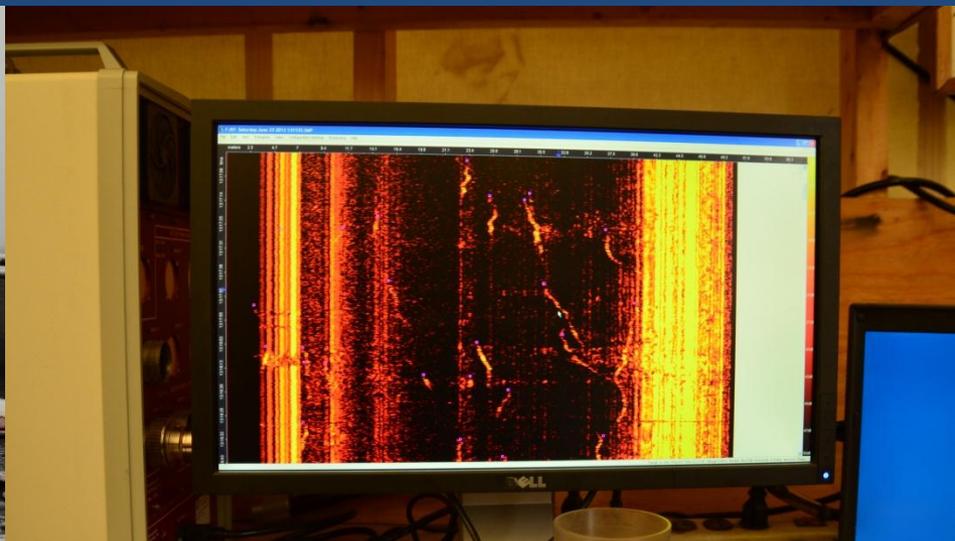
In-season run assessment indicators: Pilot Station and Eagle sonar



In-season run assessment indicators: Genetics – Mixed Stock Analysis (MSA)



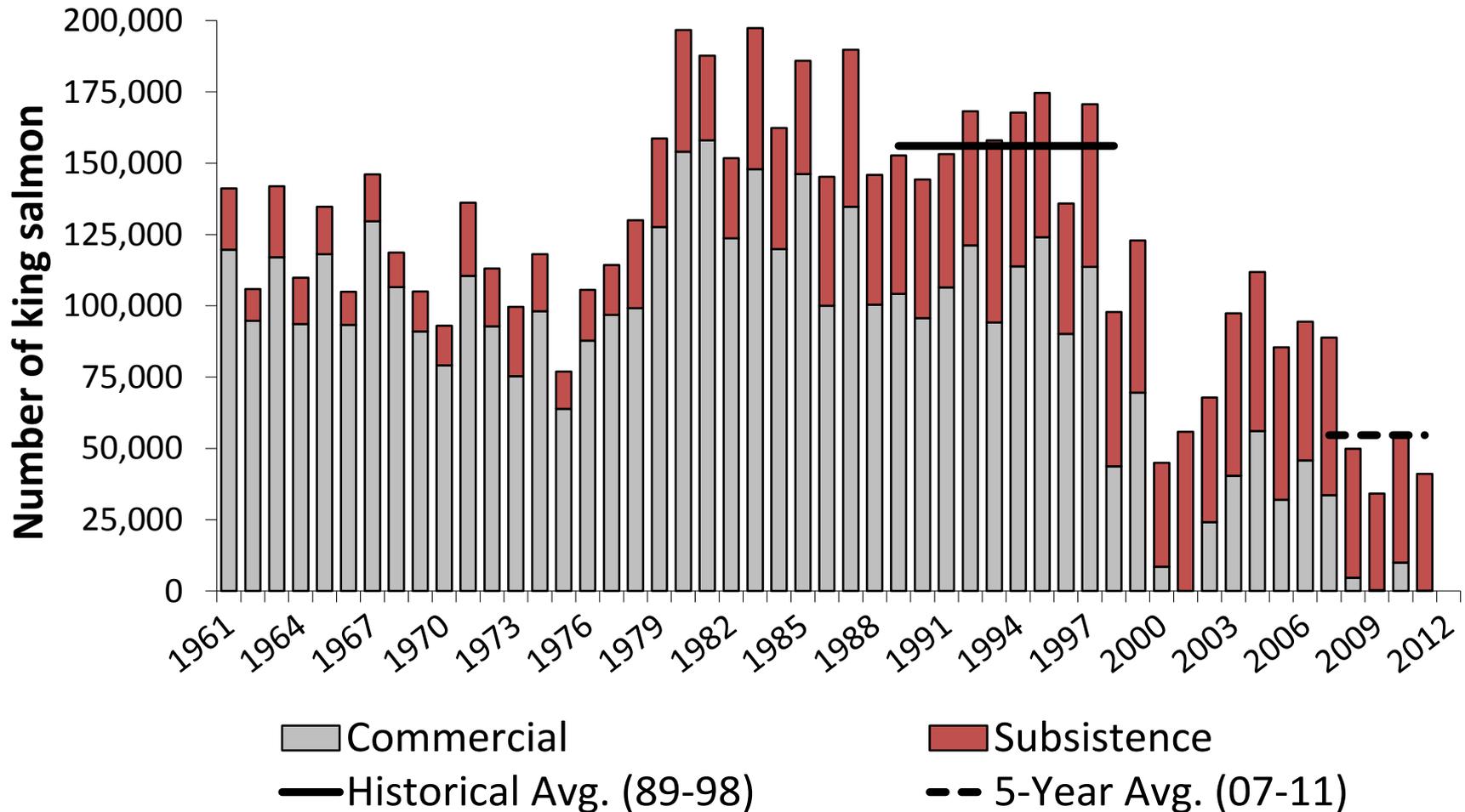
In-season run assessment indicators: Fishing reports



Overview of king salmon harvest and escapement trends

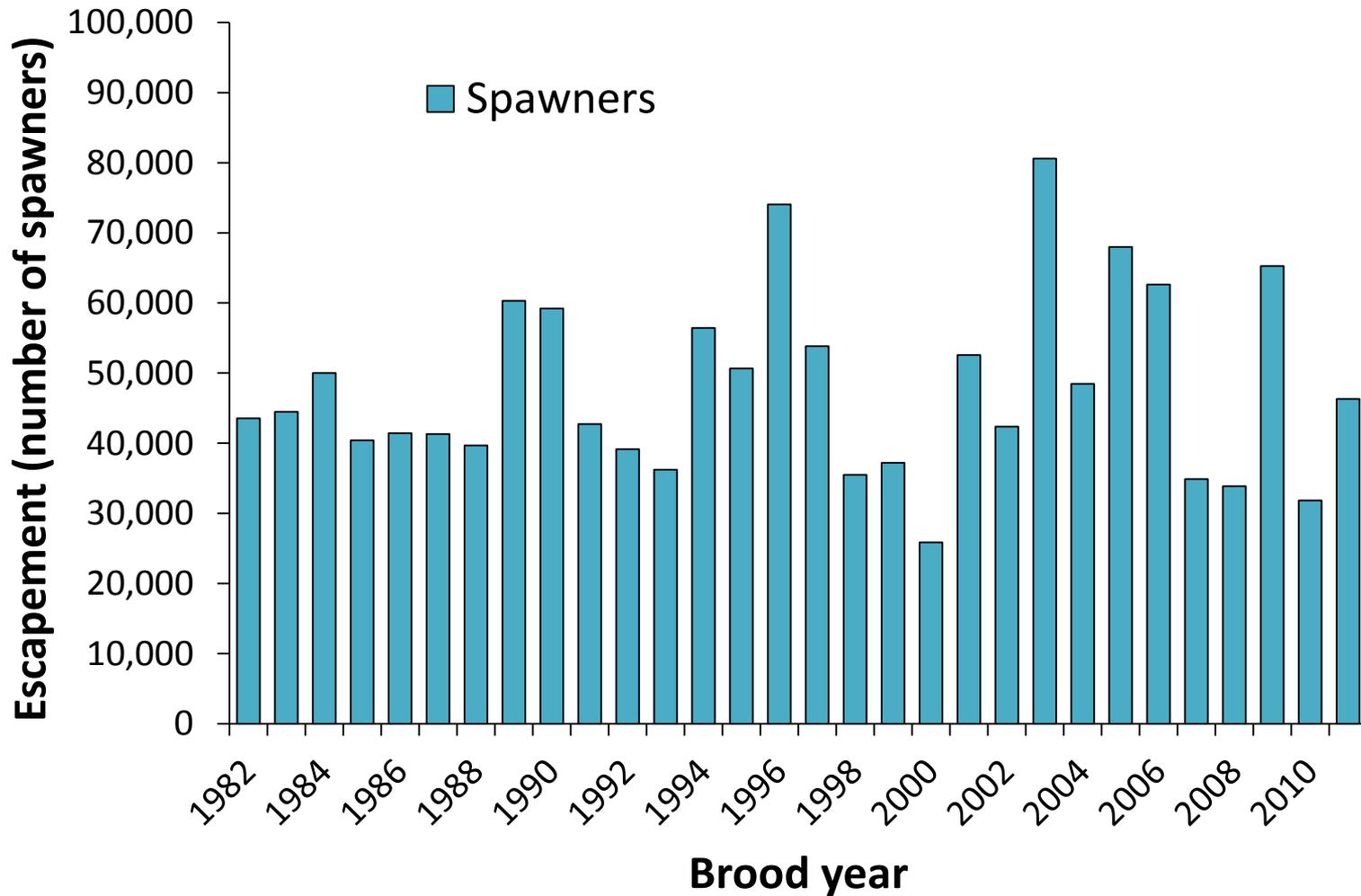


Overview of king harvest and escapement: Subsistence and commercial harvests



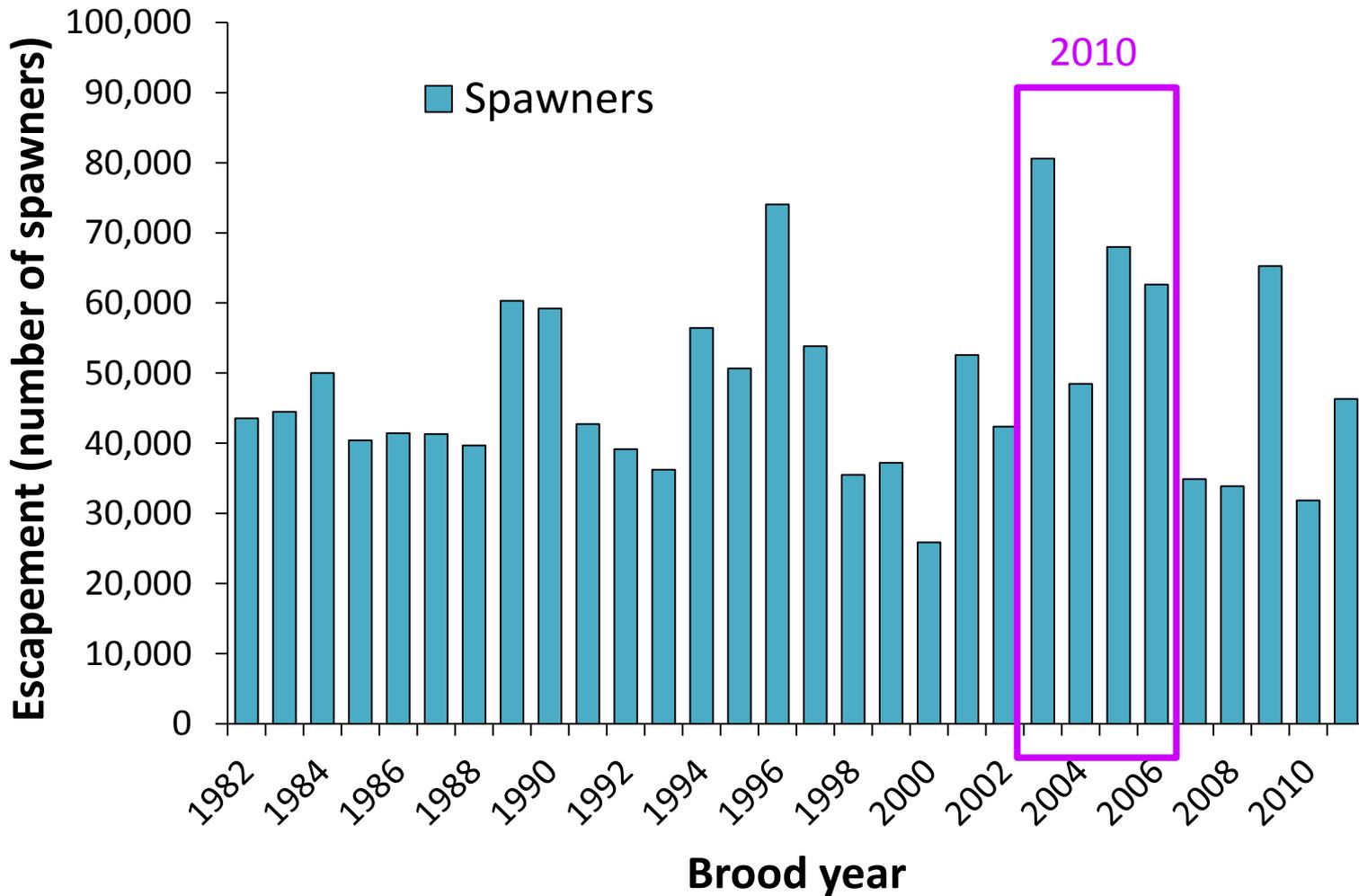
Overview of king harvest and escapement:

Canadian escapement and production



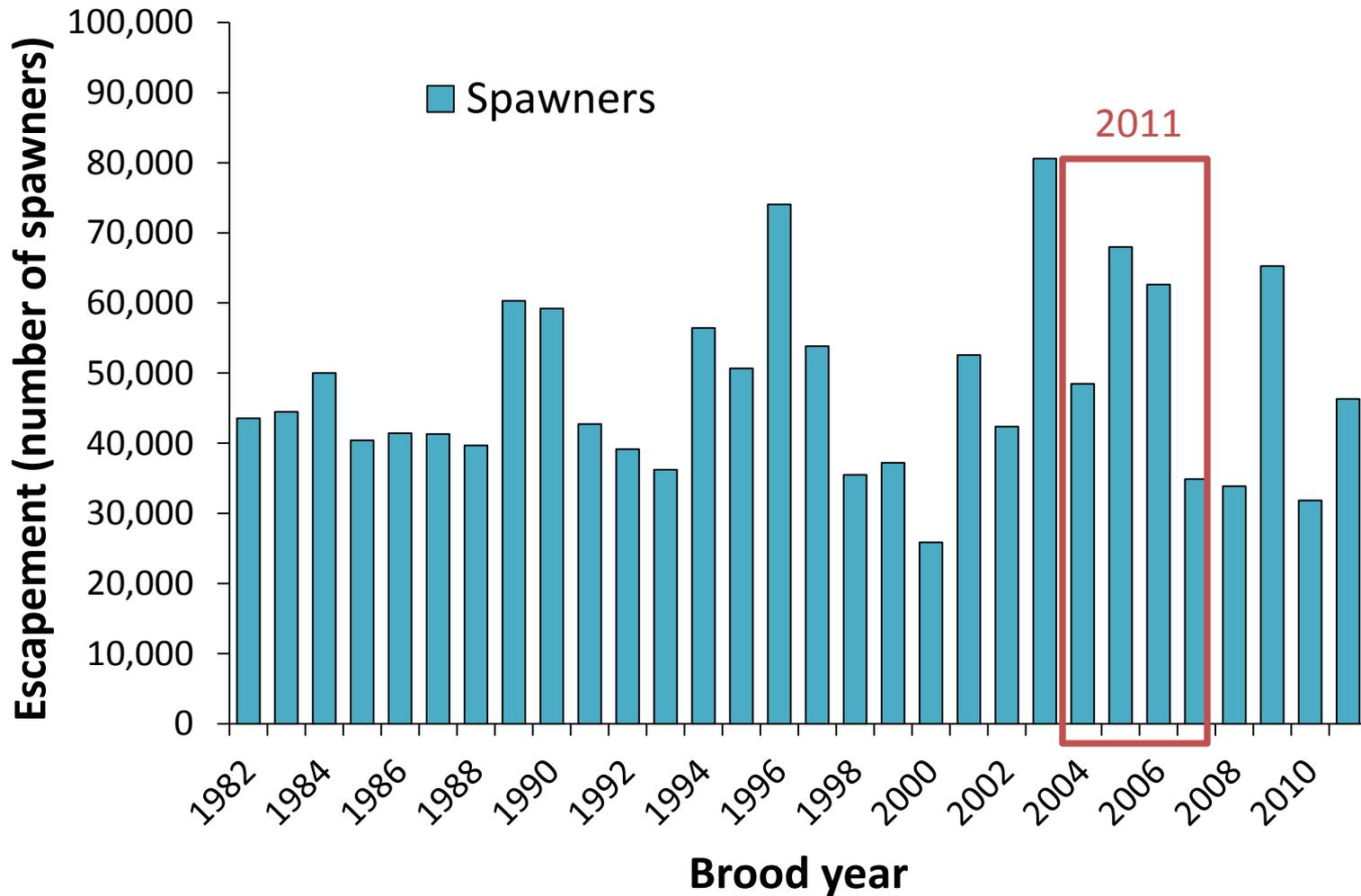
Overview of king harvest and escapement:

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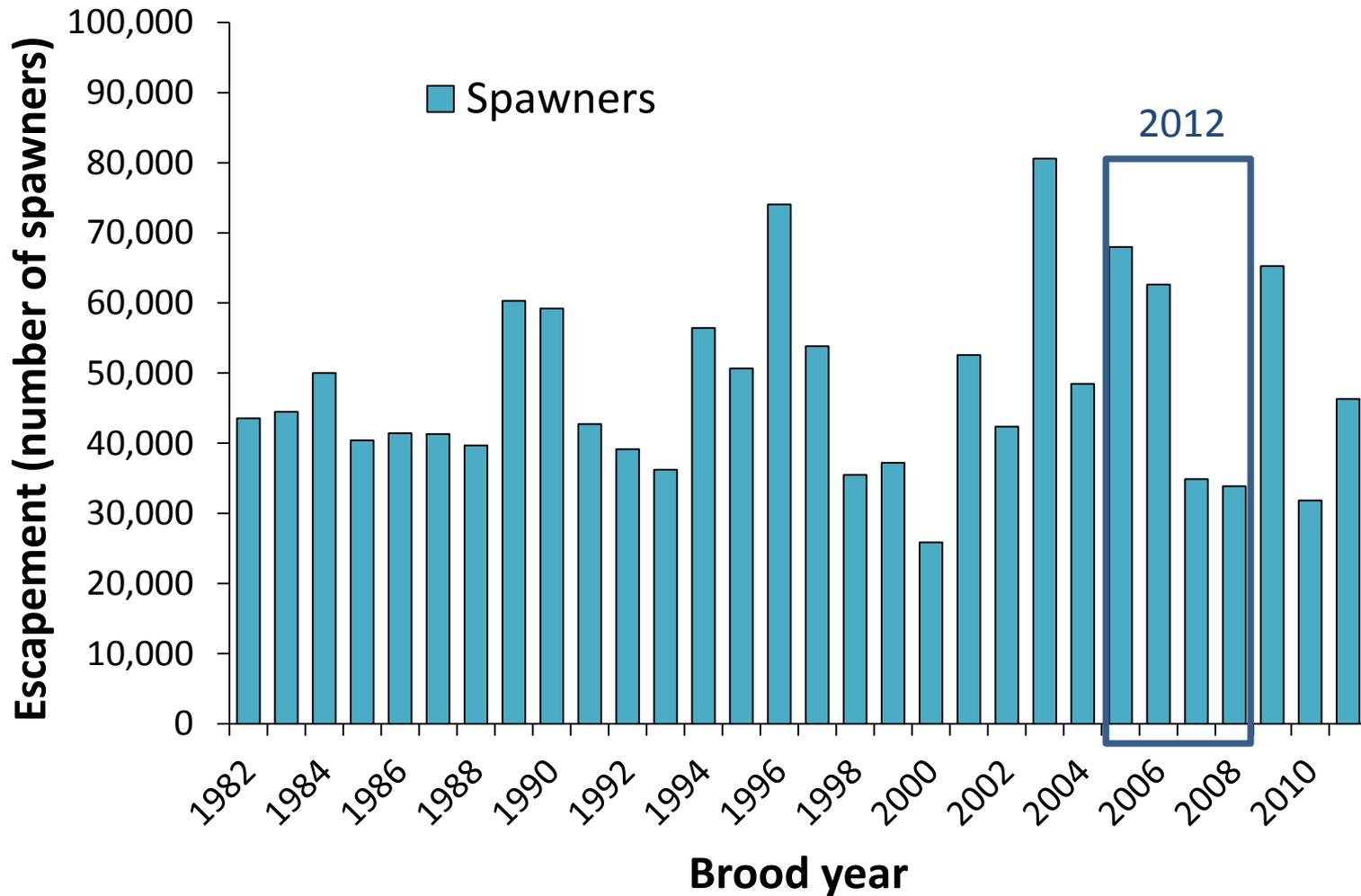
Overview of king harvest and escapement:

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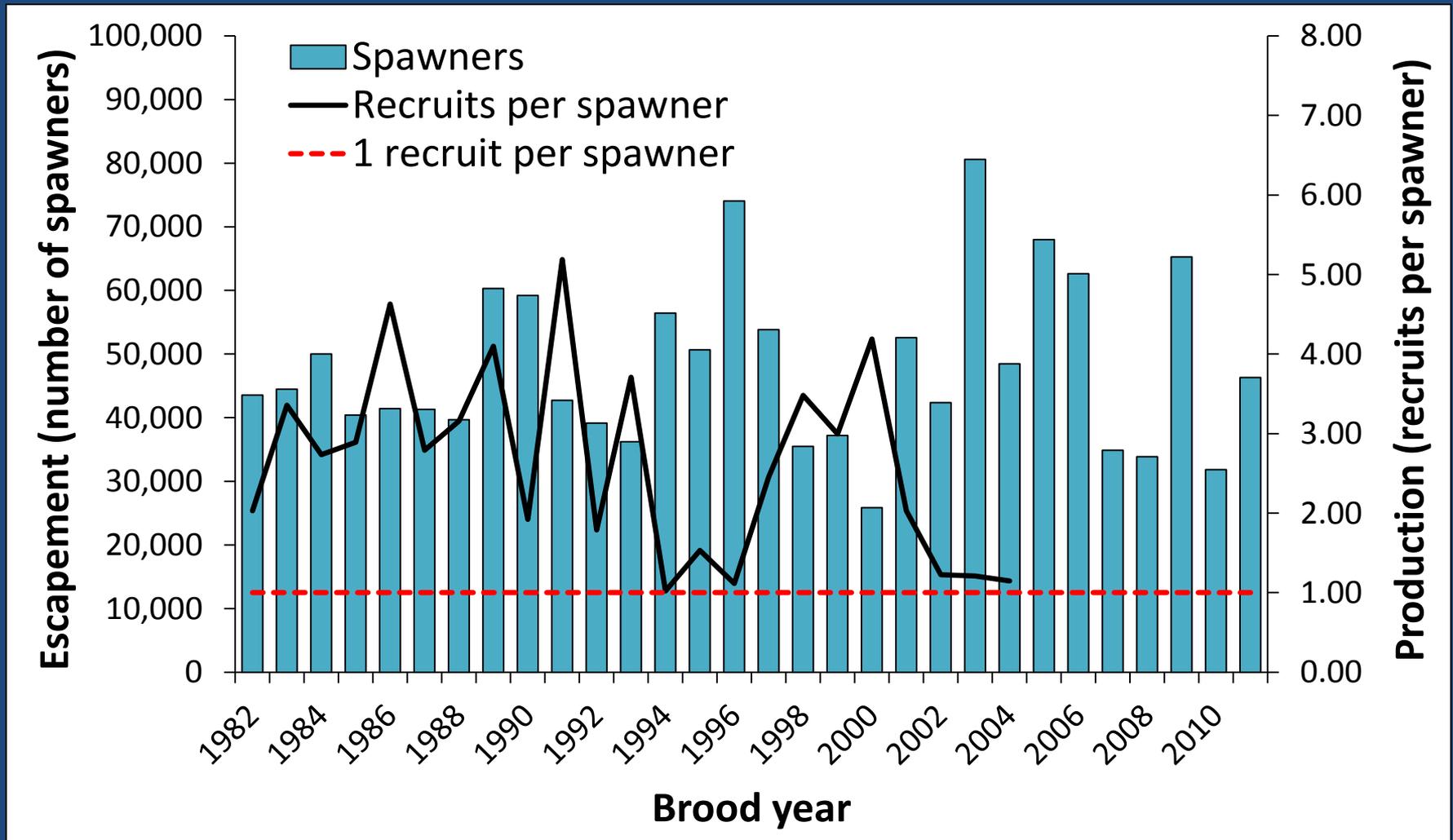
Overview of king harvest and escapement:

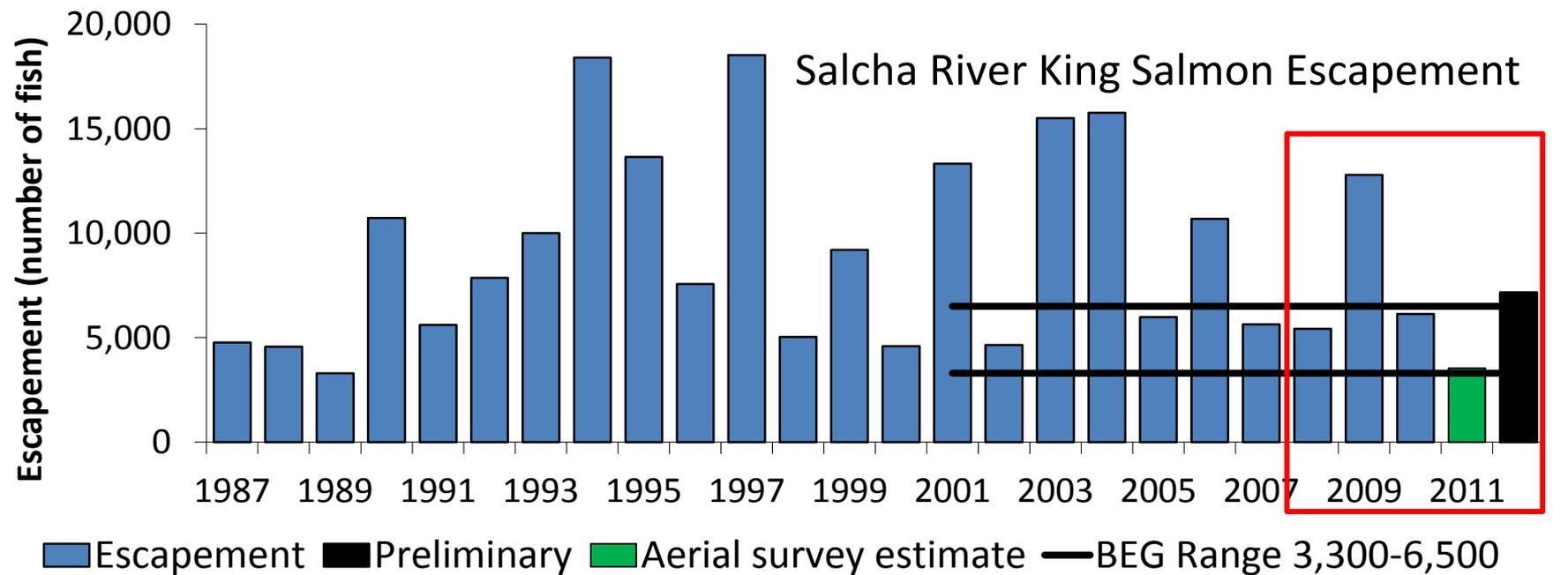
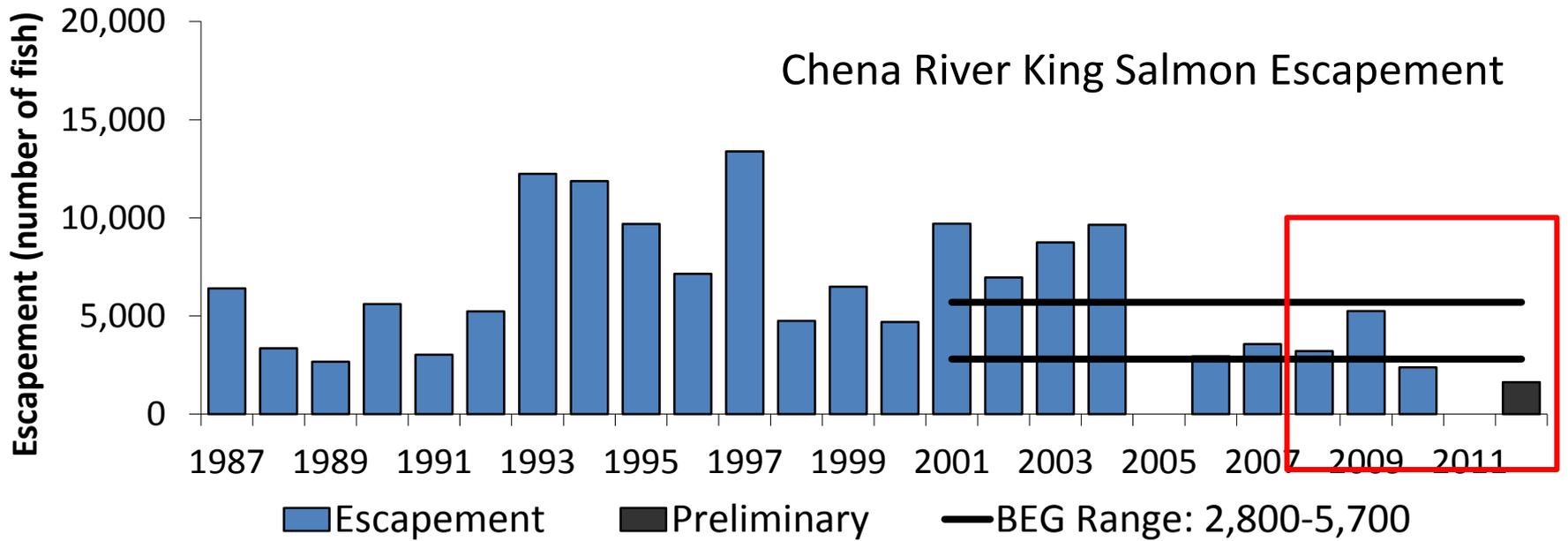
Canadian escapement and production



Overview of king harvest and escapement:

Canadian escapement and production





King salmon escapement and harvest summary

- Escapement goals generally met in the Alaska portion of the drainage from 2008-2012.
- However, low yields of king salmon have continued due to low production (as indicated from data on Canadian-origin fish).

Department Recommendation: Continue as a “Stock of Yield Concern”.



Management Issue #1:

Managing low runs to meet escapement goals and subsistence needs.



Low run subsistence fishery management: Proposals

- Proposal 131: Requires pulse protection in king salmon management plan regardless of run size.
 - EO authority implemented 2009, 2011, and 2012.

Low run subsistence fishery management: Proposals

- Proposal 131: Requires pulse protection in king salmon management plan regardless of run size.
 - EO authority implemented 2009, 2011, and 2012.
- Proposals 144 and 145: Restrict gillnets to 35 meshes in depth.
 - LTK says kings run deep; no empirical data.
 - Difficult to design an experimental study.
 - Radiotelemetry study (2002–2004) indicated king salmon were randomly distributed throughout the water column.

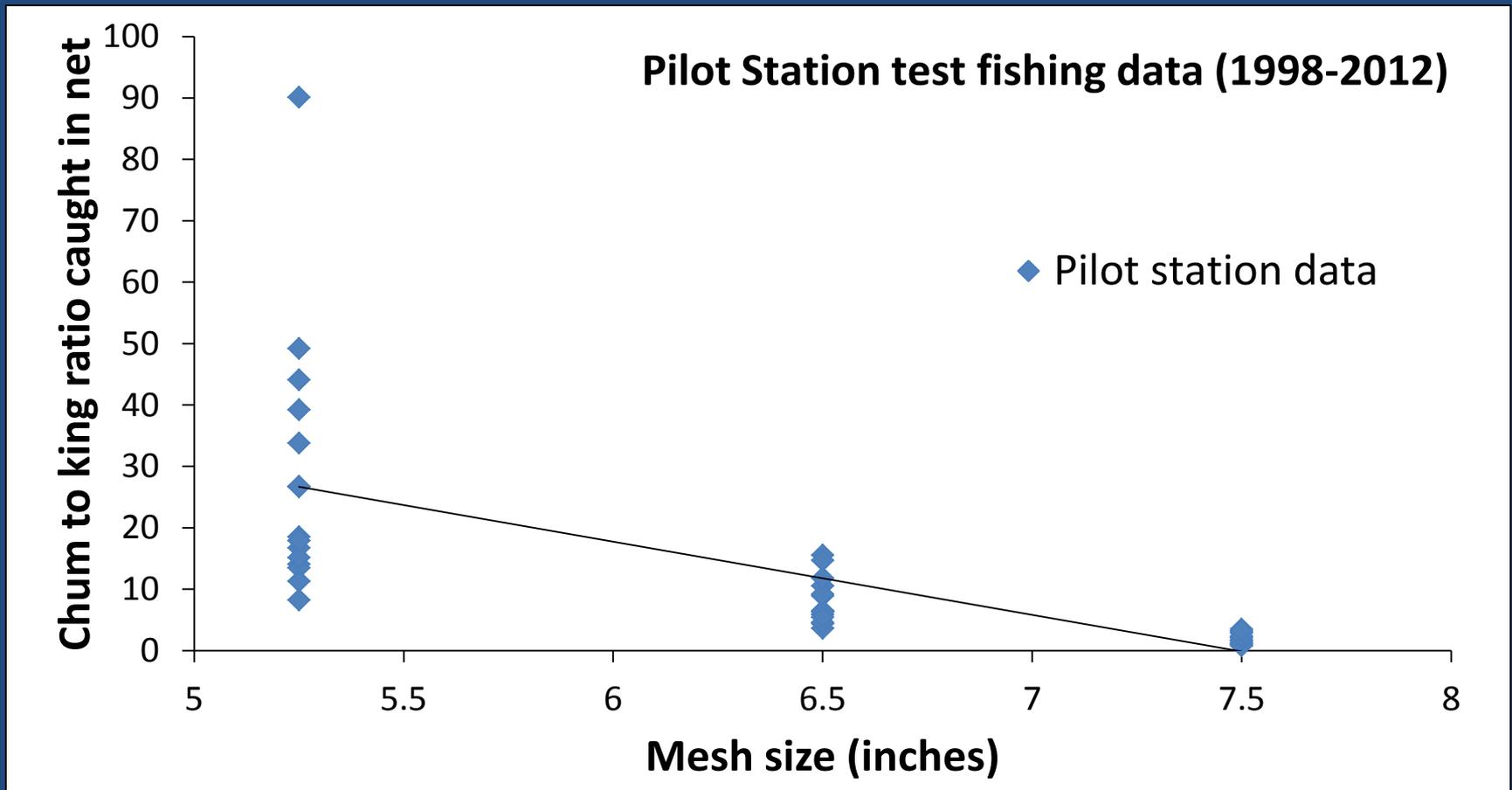
Low run subsistence fishery management: Proposals

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- Proposal 146: Restrict gillnet mesh to 6-inch or less.

Low run subsistence fishery management:

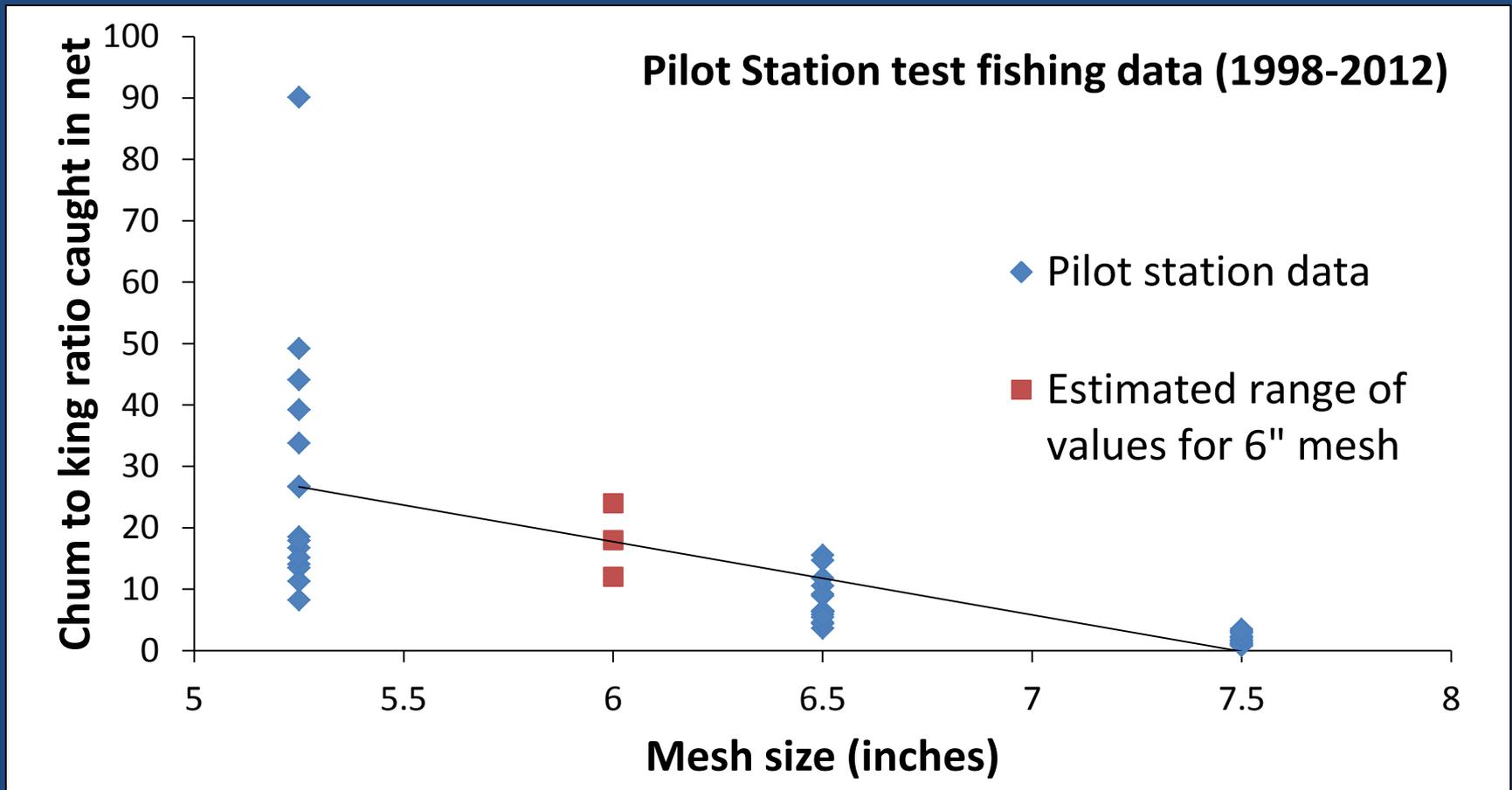
Proposal 146: Restrict mesh to 6"

Gain going from 7.5" mesh to 6" mesh?



Low run subsistence fishery management: Proposal 146: Restrict mesh to 6"

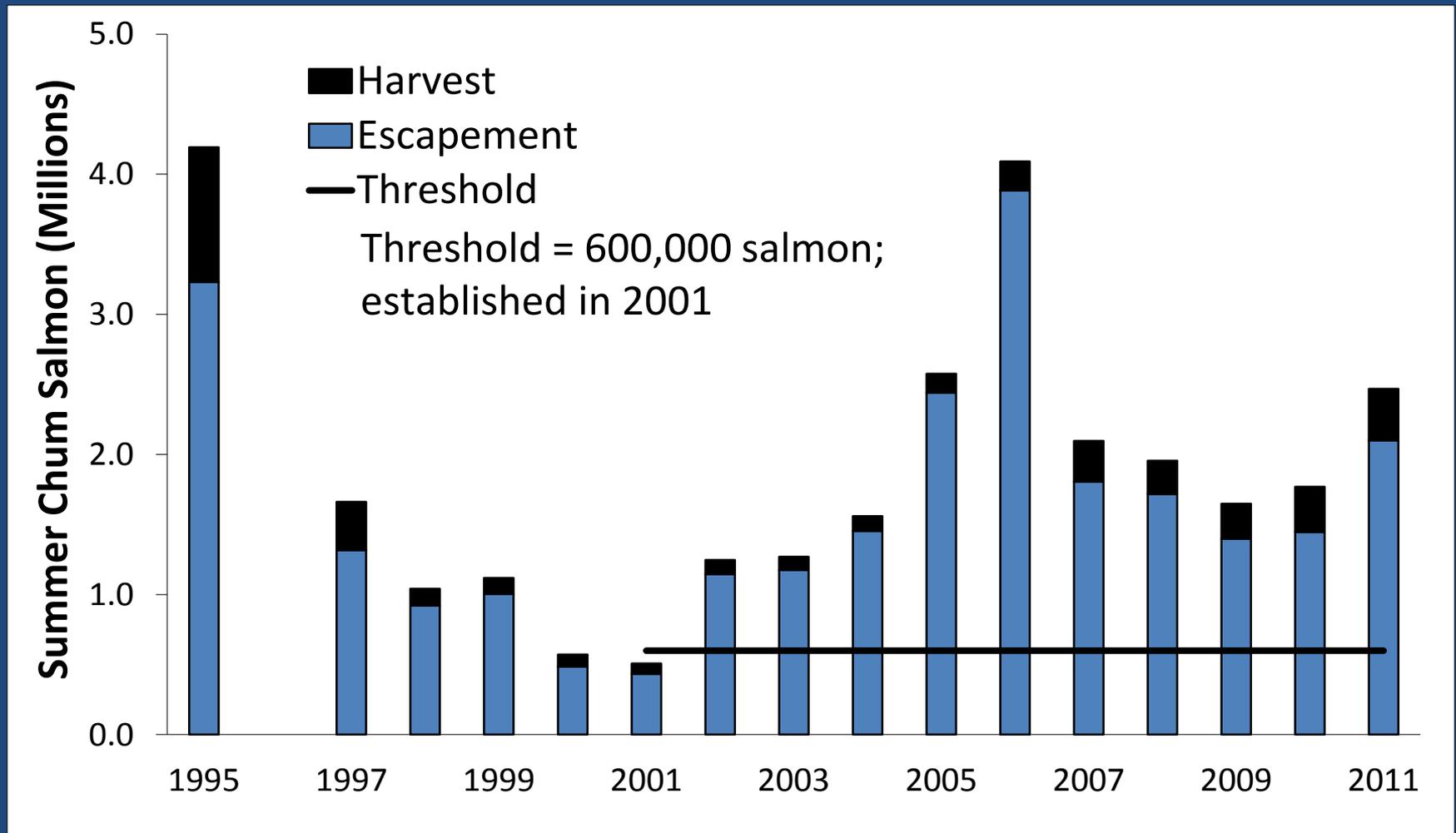
Gain going from 7.5" mesh to 6" mesh?



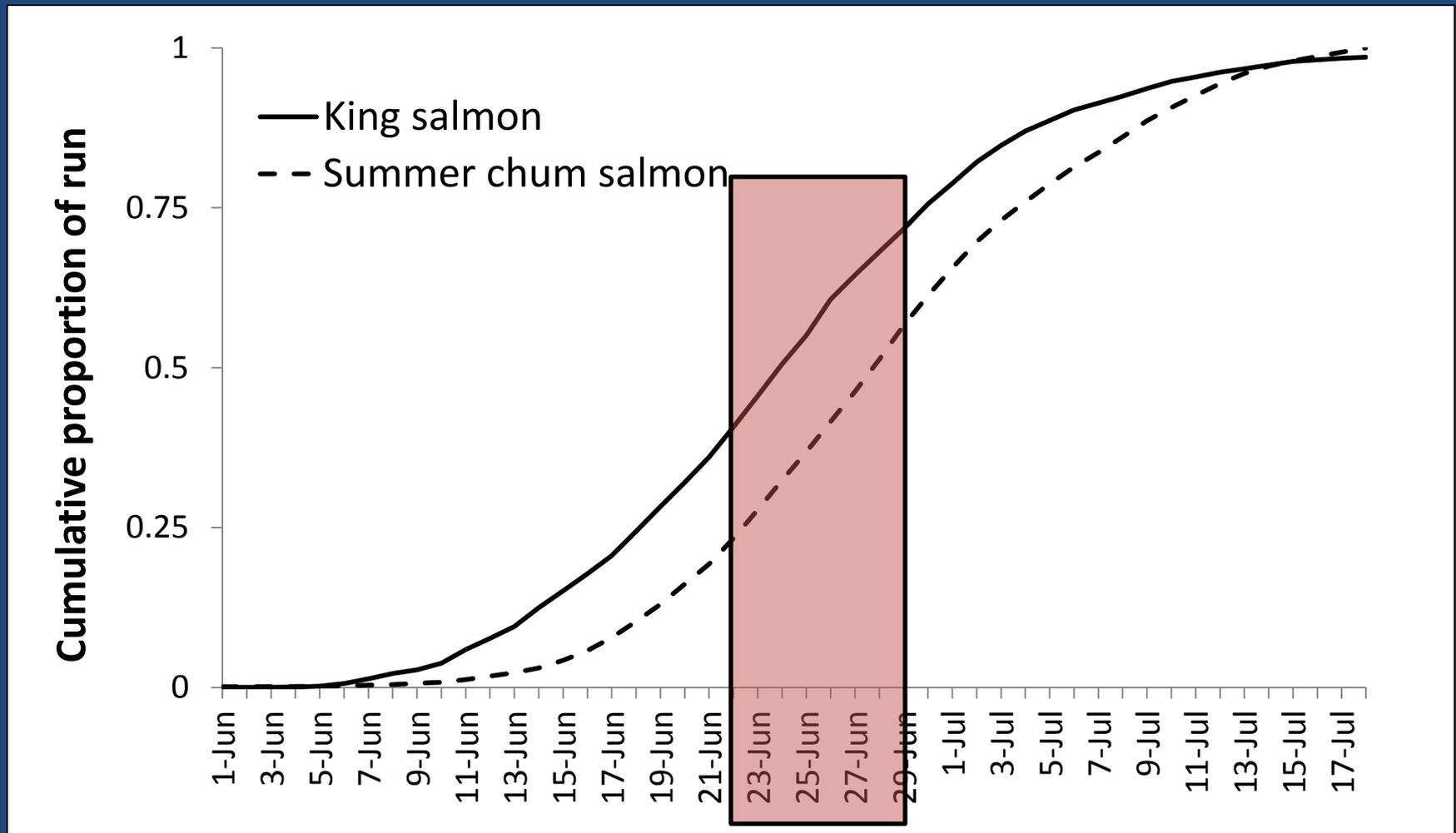
Management Issue #2:
Incidental king salmon caught in
commercial chum salmon fishery.



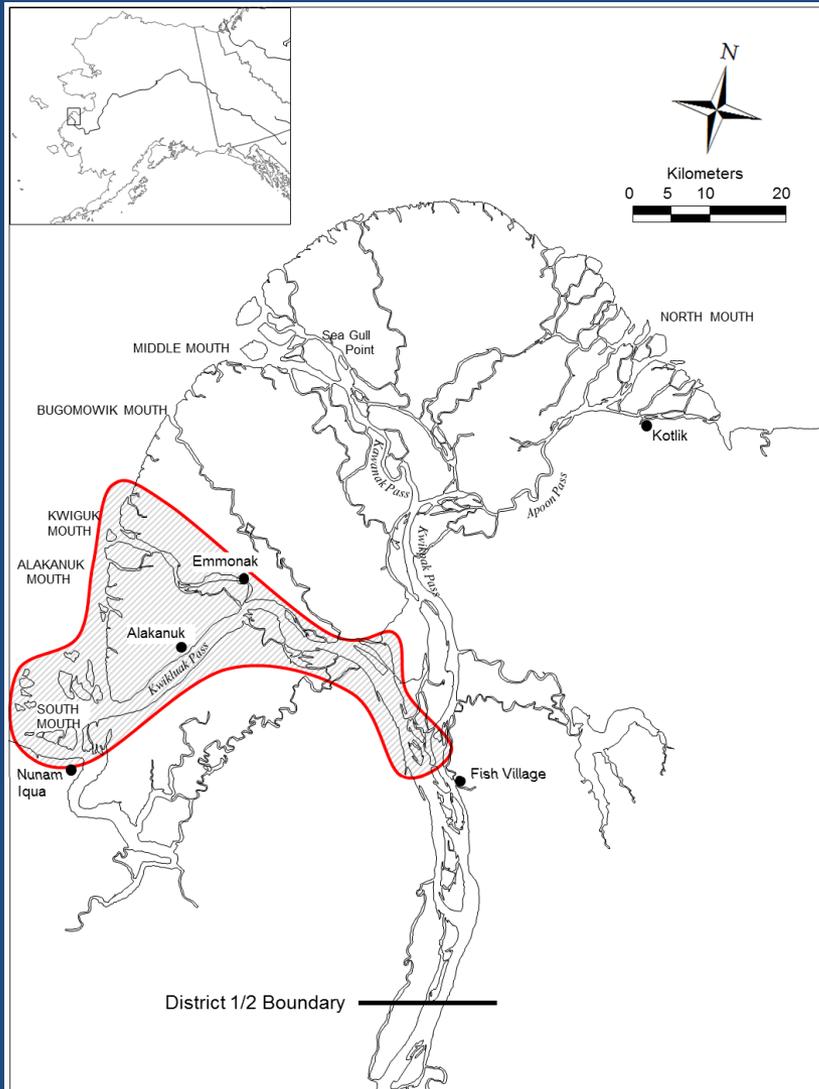
Incidental harvest management: Summer chum salmon total run size



Incidental harvest management: Summer chum and king run timing overlap

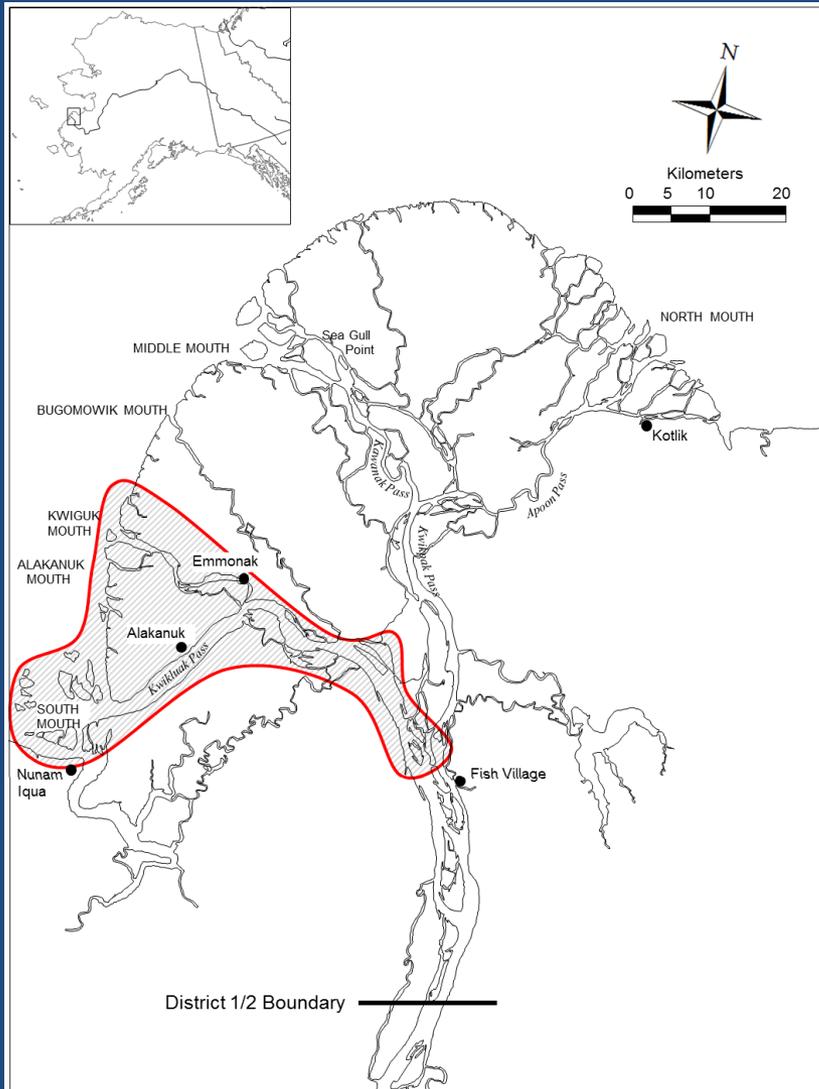


Incidental harvest management: 2012 Lower Yukon s. chum commercial fishery



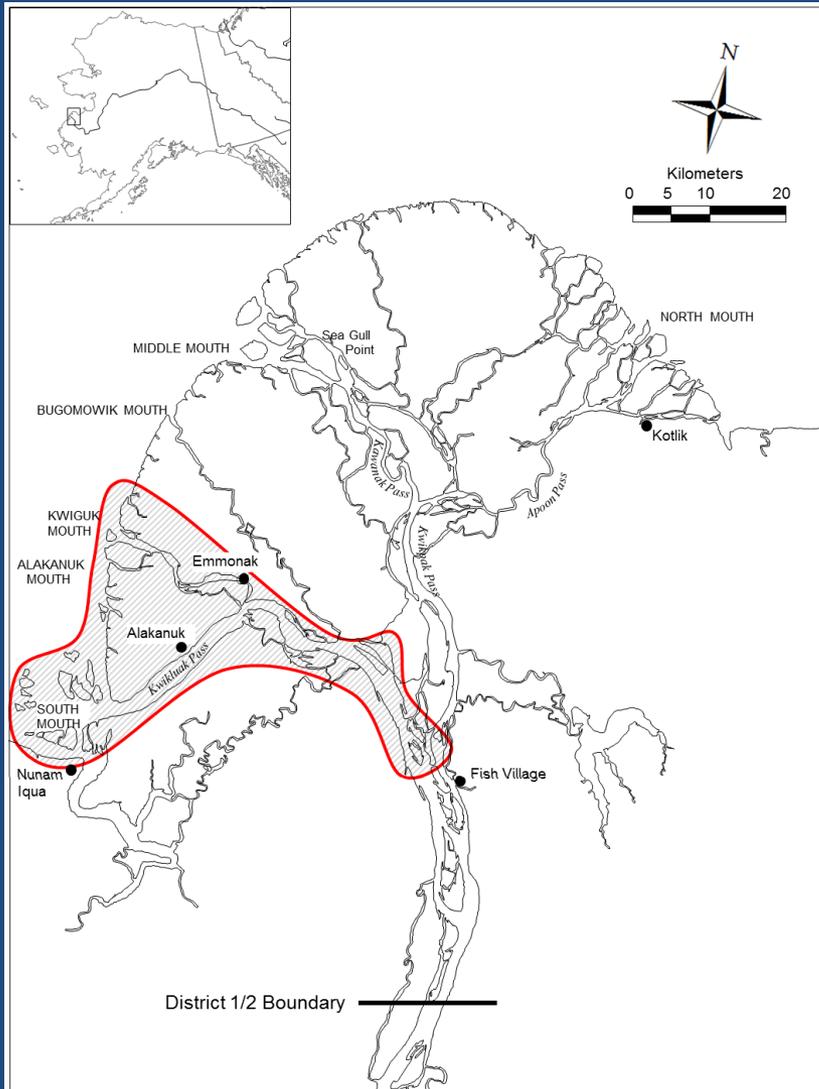
- Delay start of season.

Incidental harvest management: 2012 Lower Yukon s. chum commercial fishery



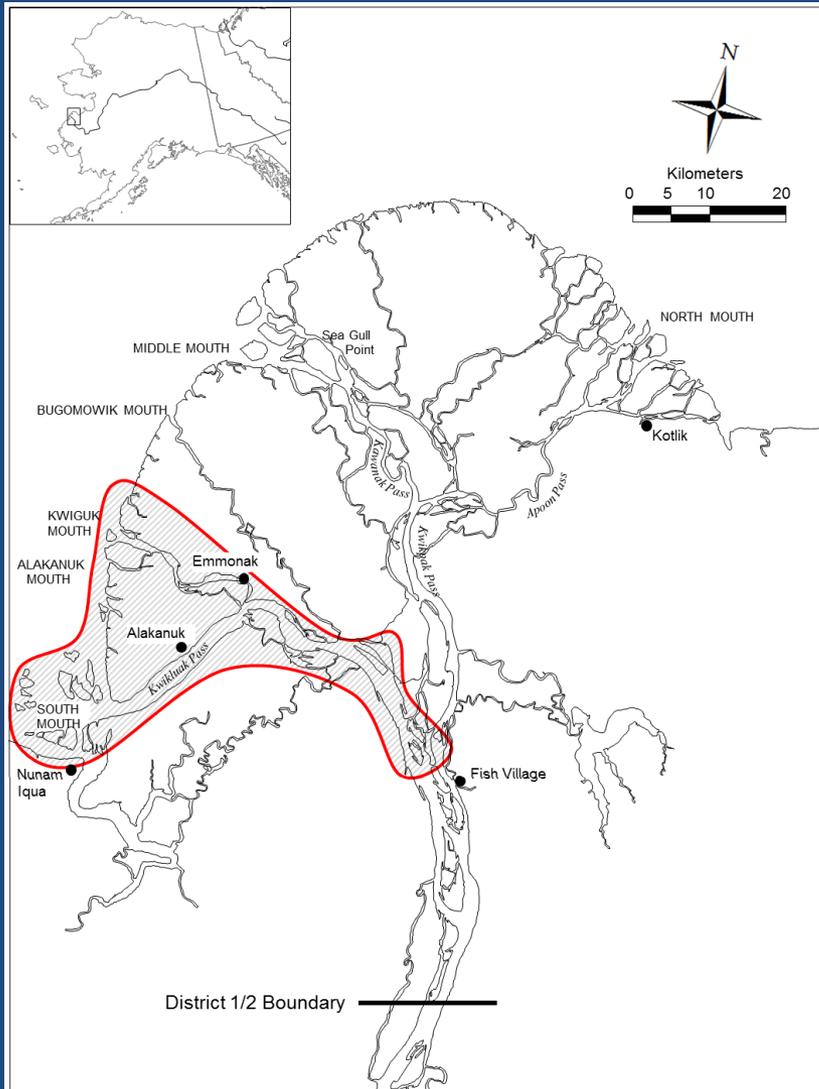
- Delay start of season.
- 6" or smaller mesh-size restriction.

Incidental harvest management: 2012 Lower Yukon s. chum commercial fishery



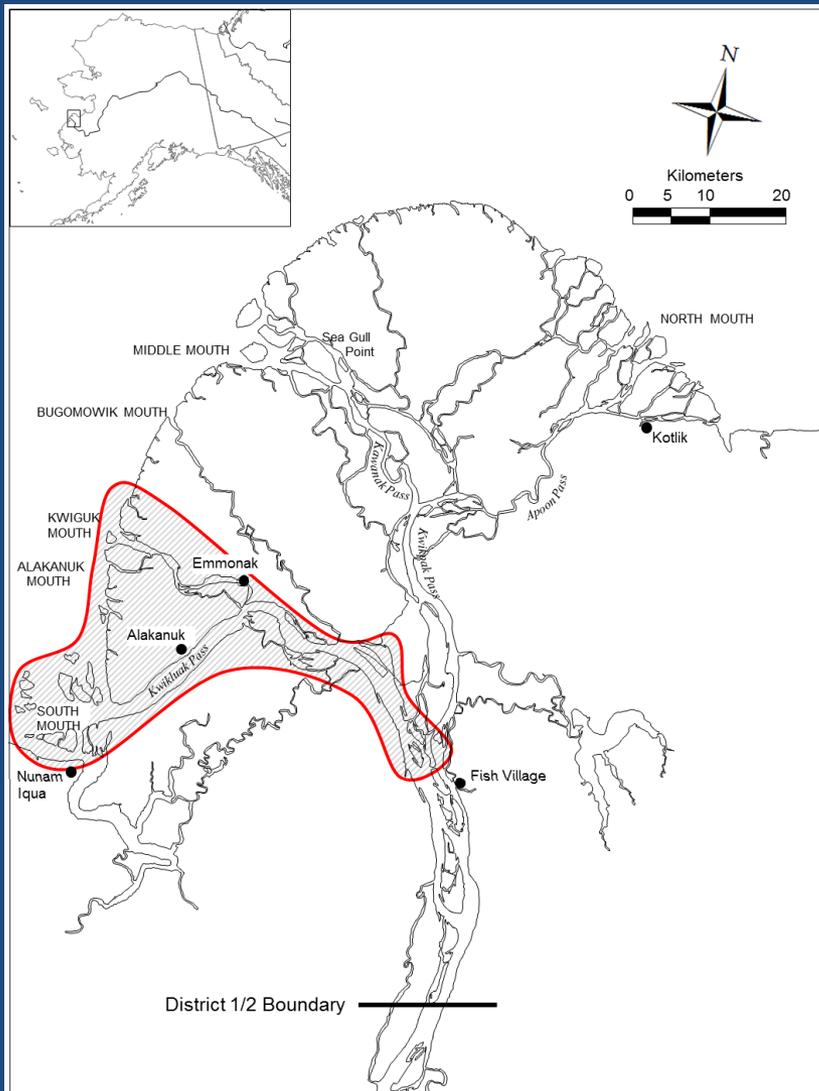
- Delay start of season
- 6" or smaller mesh-size restriction
- No sale of incidental king salmon

Incidental harvest management: 2012 Lower Yukon s. chum commercial fishery



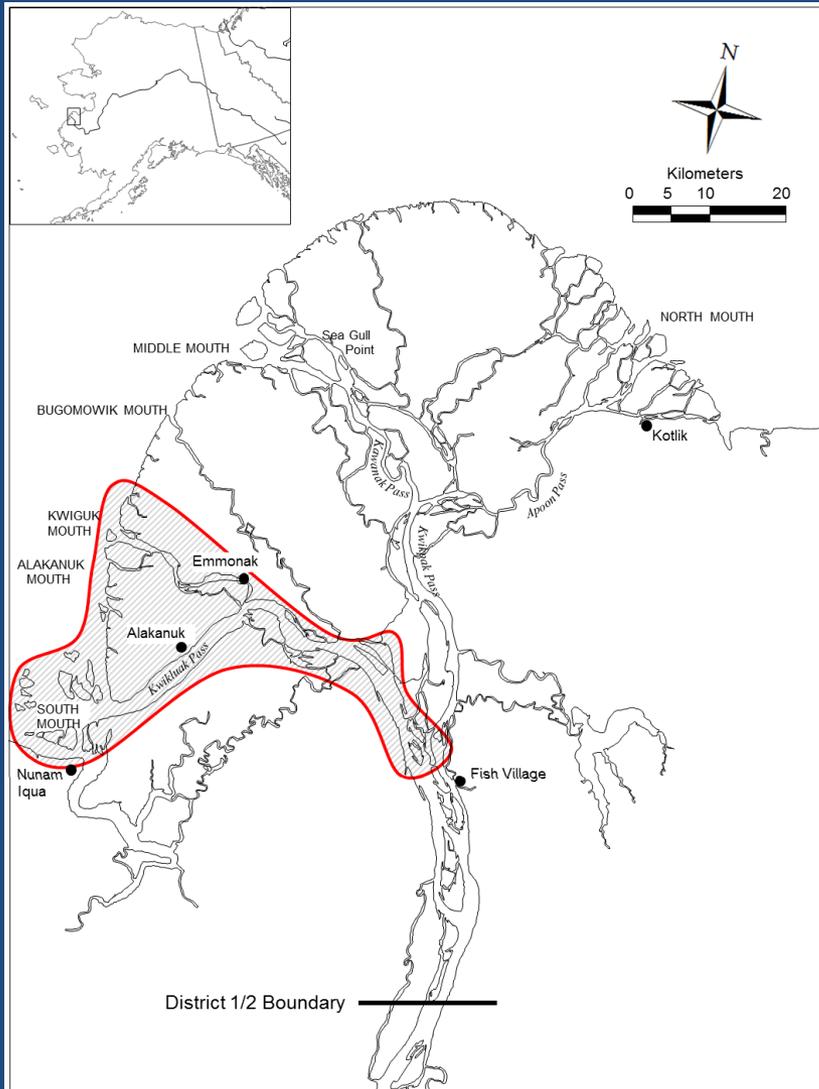
- Delay start of season.
- 6" or smaller mesh-size restriction.
- No sale of incidental king salmon.
- Concurrent commercial and subsistence openings.

Incidental harvest management: 2012 Lower Yukon s. chum commercial fishery



- Delay start of season.
- 6" or smaller mesh-size restriction.
- No sale of incidental king salmon.
- Concurrent commercial and subsistence openings.
- Limit area to portions of districts.

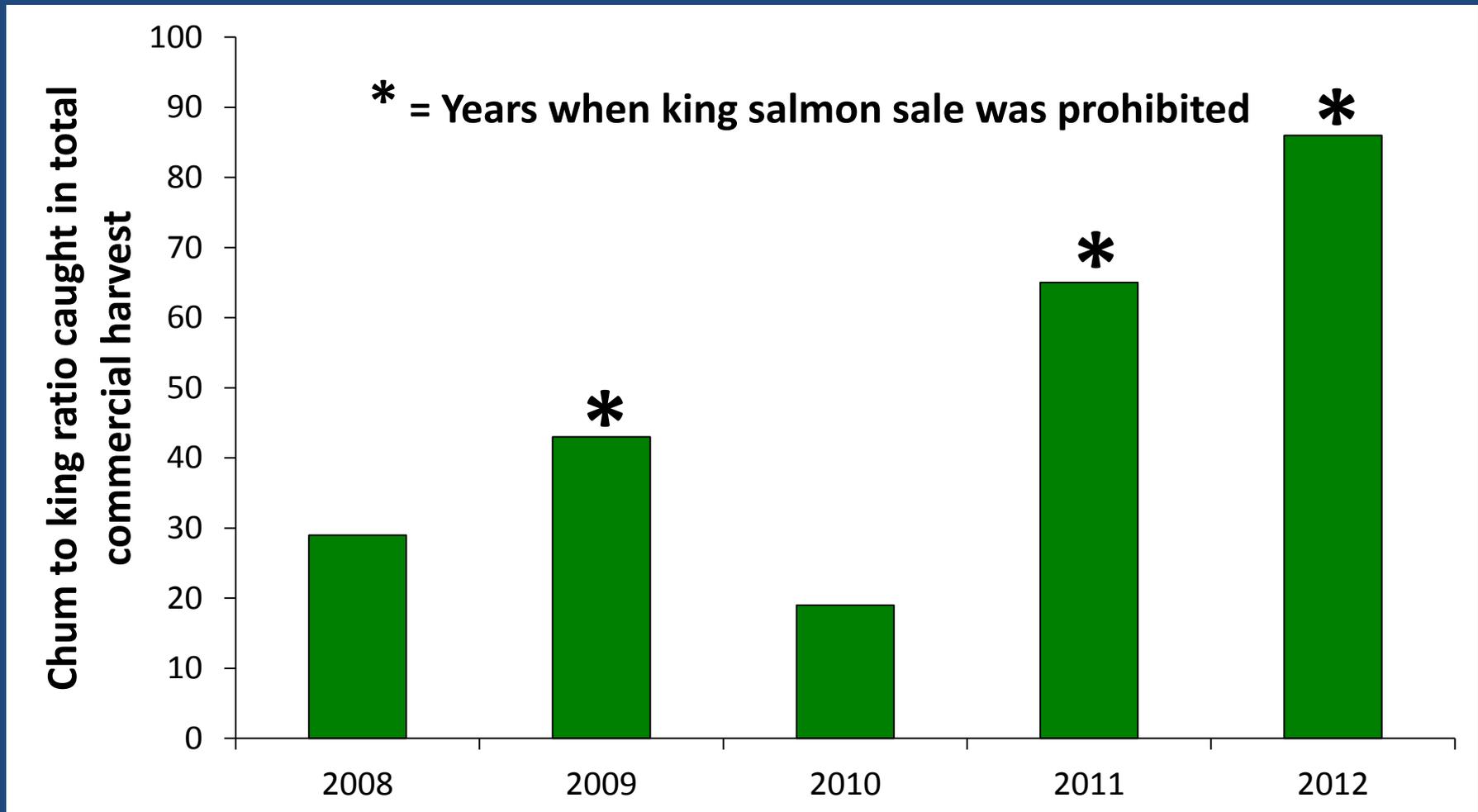
Incidental harvest management: 2012 Lower Yukon s. chum commercial fishery



- Delay start of season.
 - 6" or smaller mesh-size restriction.
 - No sale of incidental king salmon.
 - Concurrent commercial and subsistence openings.
 - Limit area to portions of districts.
-
- Commercial opportunity based on:
 1. Test fishing data.
 2. Commercial incidental harvest.

Incidental harvest management:

Chum to king ratio in LY commercial chum fishery



Incidental harvest management: 2012 Upper Yukon s. chum commercial fishery

Subdistrict 4A Kaltag Fishery

- 108,222 summer chum salmon, 13 periods (552 hours).
- 59 king salmon reported as caught/released.



Proposal 241: Fish wheels during commercial chum fishery in District 6.

- 3,504 summer chum salmon, 7 periods (420 hours).
- 172 king salmon reported as caught/released.



Incidental harvest management: Proposals

- Proposal 132: Prohibit sale of king salmon.
 - EO authority implemented 2009, 2011, and 2012.
 - Criterion: implemented when restrictions on subsistence for king salmon are necessary.

Incidental harvest management: Proposals

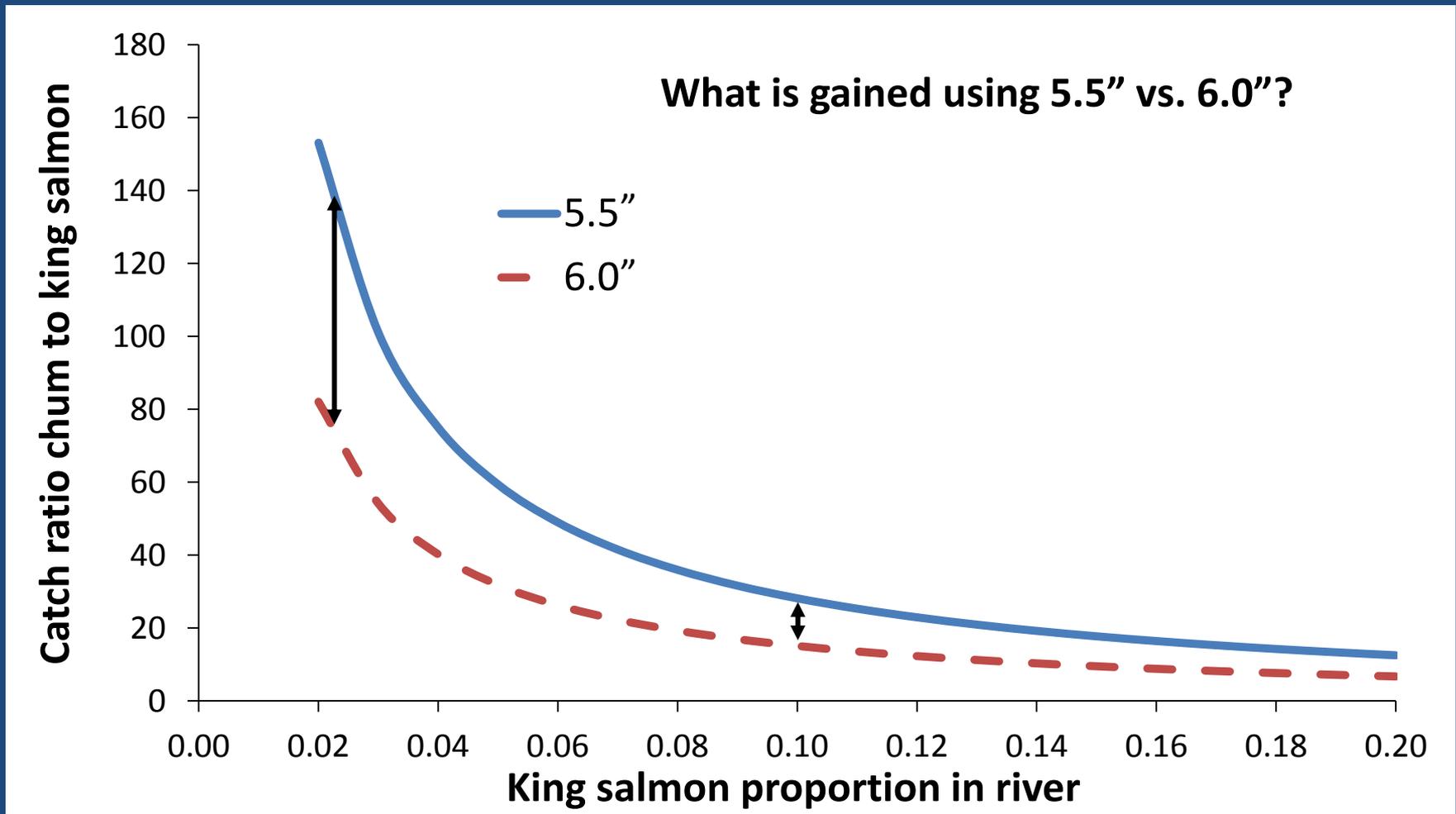
- Proposal 132: Prohibit sale of king salmon.
- Proposal 133: Allow for chum salmon commercial fishery with maximum 5.5-inch mesh and maximum 30-mesh depth (districts 1–3).
- Proposal 134: Allow for chum salmon commercial fishery with maximum 6-inch and maximum 30-mesh depth (June–July in district 1).

Incidental harvest management: Proposals

- Proposal 132: Prohibit sale of king salmon.
- Proposal 133: Allow for chum salmon commercial fishery with maximum 5.5-inch mesh and maximum 30-mesh depth (districts 1–3).
- Proposal 134: Allow for chum salmon commercial fishery with maximum 6-inch and maximum 30-mesh depth (June–July in district 1).
 - **Mesh depth:**
 - LTK says kings run deep; no empirical data.
 - Difficult to design an experimental study.
 - Radiotelemetry data showed king salmon distributed throughout the water column.

Incidental harvest management:

Proposals 133 and 134: Restrict mesh size.



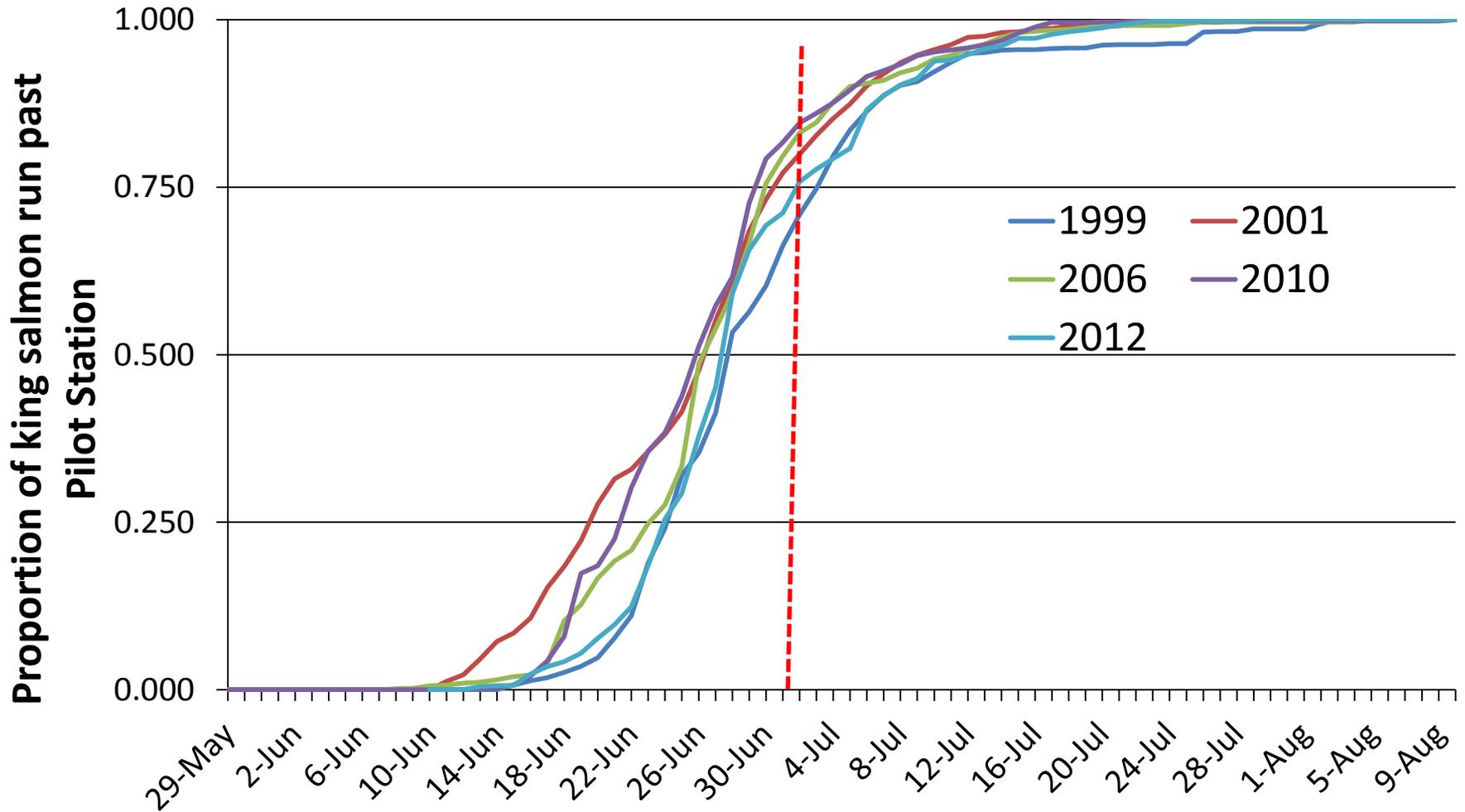
Based on Bromaghin 2005, *Fisheries Research*

Incidental harvest management: Proposals

- Proposal 132: Prohibit sale of king salmon.
- Proposal 133: Allow for chum salmon commercial fishery with maximum 5.5-inch mesh and maximum 30-mesh depth (districts 1–3).
- Proposal 134: Allow for chum salmon commercial fishery with maximum 6-inch and maximum 30-mesh depth (June–July in district 1).
- Proposal 135: Allow for commercial chum salmon fishery with 6-inch or smaller mesh no later than July 1.

Incidental harvest management:

Proposal 135: Chum commercial opening July 1.



Incidental harvest management: Proposals

- Proposal 132: Prohibit sale of king salmon.
- Proposal 133: Allow for chum salmon commercial fishery with maximum 5.5-inch mesh and maximum 30-mesh depth (districts 1–3).
- Proposal 134: Allow for chum salmon commercial fishery with maximum 6-inch and maximum 30-mesh depth (June–July in district 1).
- Proposal 135: Allow for commercial chum salmon fishery with 6-inch or smaller mesh no later than July 1.
- Proposal 136: Cap incidental harvest of king salmon at 2,000.

Incidental harvest management:

Proposal 136: 2,000 incidental king salmon cap.

Year	Summer chum cumulative catch	Summer chum harvest lost	Additional king salmon saved
2011	56,500	210,000	2,000
2012	162,000	50,000	400

Incidental harvest management:

Proposal 136: 2,000 incidental king salmon cap.

Year	Summer chum cumulative catch	Summer chum harvest lost	Additional king salmon saved
2011	56,500	210,000	2,000
2012	162,000	50,000	400

Near-term future priorities

- Inform the public regarding any actions taken by the board.
- Evaluate 2012 conservation measures.
- Continue to seek public input to develop preseason management strategies:
 - Yukon Advisory Group (YAG) teleconferences.
 - Yukon River Drainage Fisheries Association (YRDFA) meeting.
 - TCC meeting.
 - AC and RAC meetings.

Acknowledgements

Data collection and assessment projects

Yukon Panel

Bering Sea Fishermen's Association

Yukon Delta Fisheries Development Association

US Fish and Wildlife Service

Association of Village Council Presidents

Tanana Chiefs Conference

Ruby Tribal Council

Bureau of Land Management

National Ocean and Atmospheric Administration

Department of Fisheries and Oceans

Stakeholder meetings

Yukon Panel

Yukon River Drainage Fisheries Association

Thank you



Socioeconomic Effects of King Salmon Declines, Yukon River

Caroline Brown,
Subsistence Resource Specialist III

Prepared for the Alaska Board of Fisheries

January 2013

RC 7, Tab 7

Background

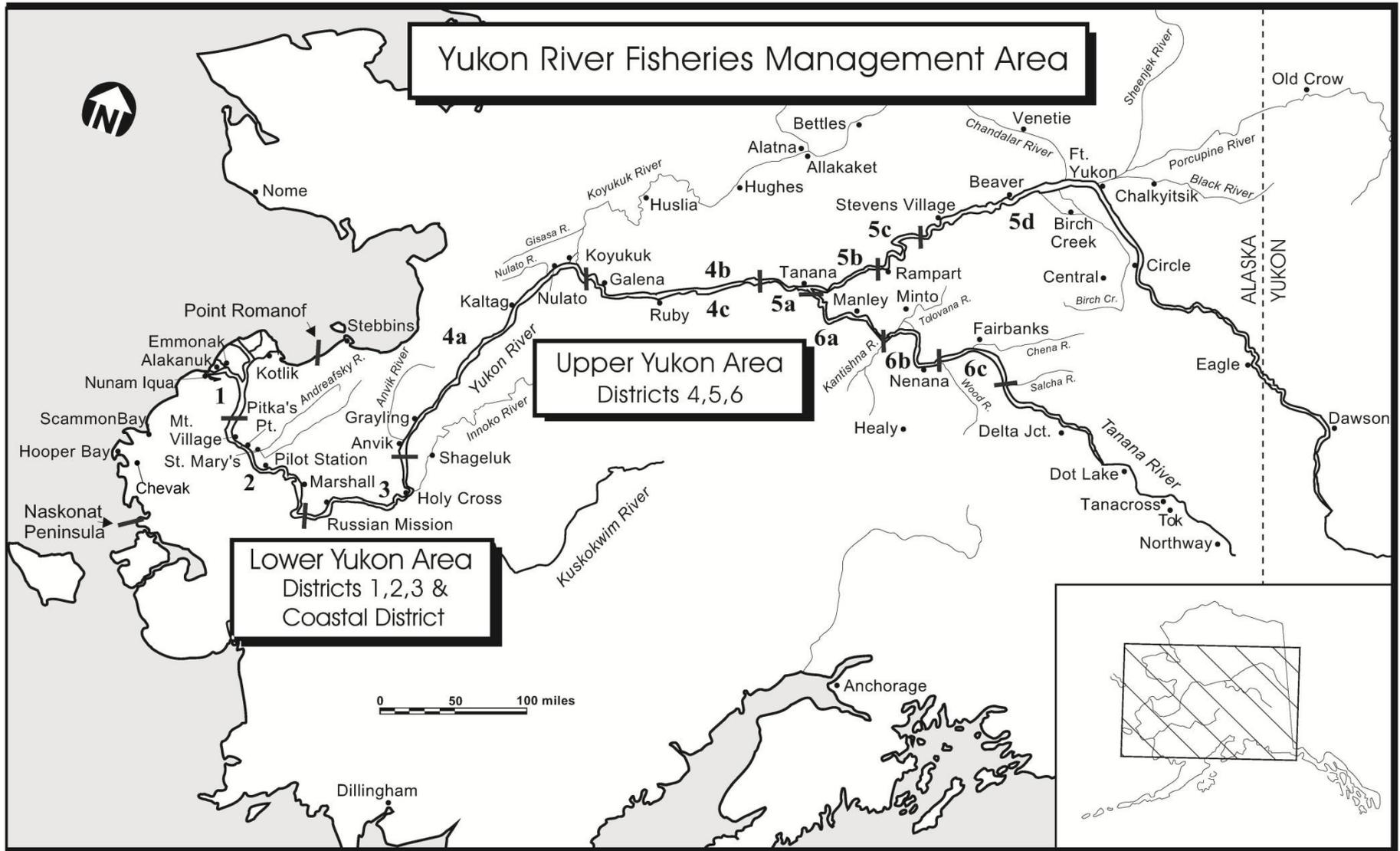
- King salmon crash in 2000.
- Poor king salmon returns in 2009 – economic disaster declaration.
- 2010–2012: continued low returns with subsistence restrictions.



Objectives

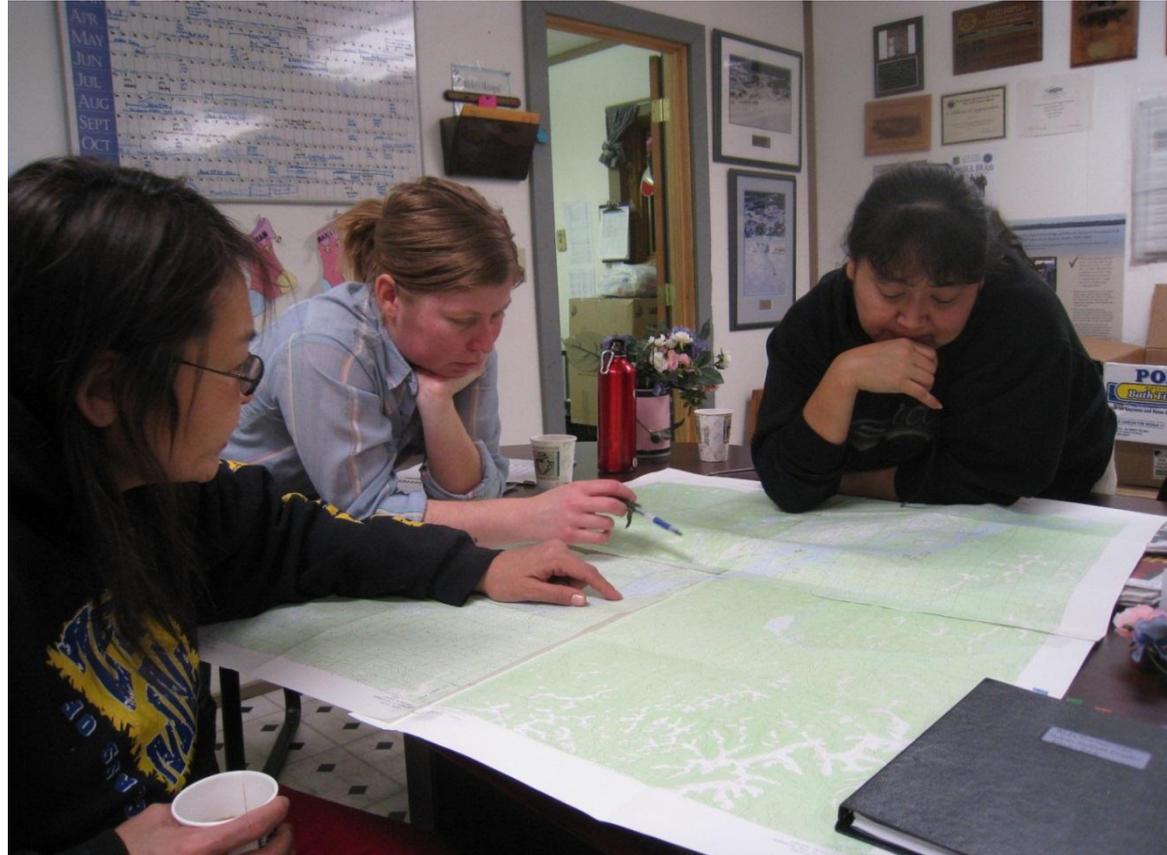
- Investigate the influence of low king salmon returns on fishing patterns and priorities.
 - a. Effects on social organization of fishing.
 - b. Locations and gear types used.
 - c. Role of restrictions on subsistence opportunity.
 - d. Patterns of exchange of fish (sharing, barter, customary trade).

Yukon Area



Methods (qualitative)

- Emmonak, Marshall, Nulato, Beaver, and Eagle (city and village).
- Semi-structured key respondent interviews.
- Mapping.
- Participant observation.



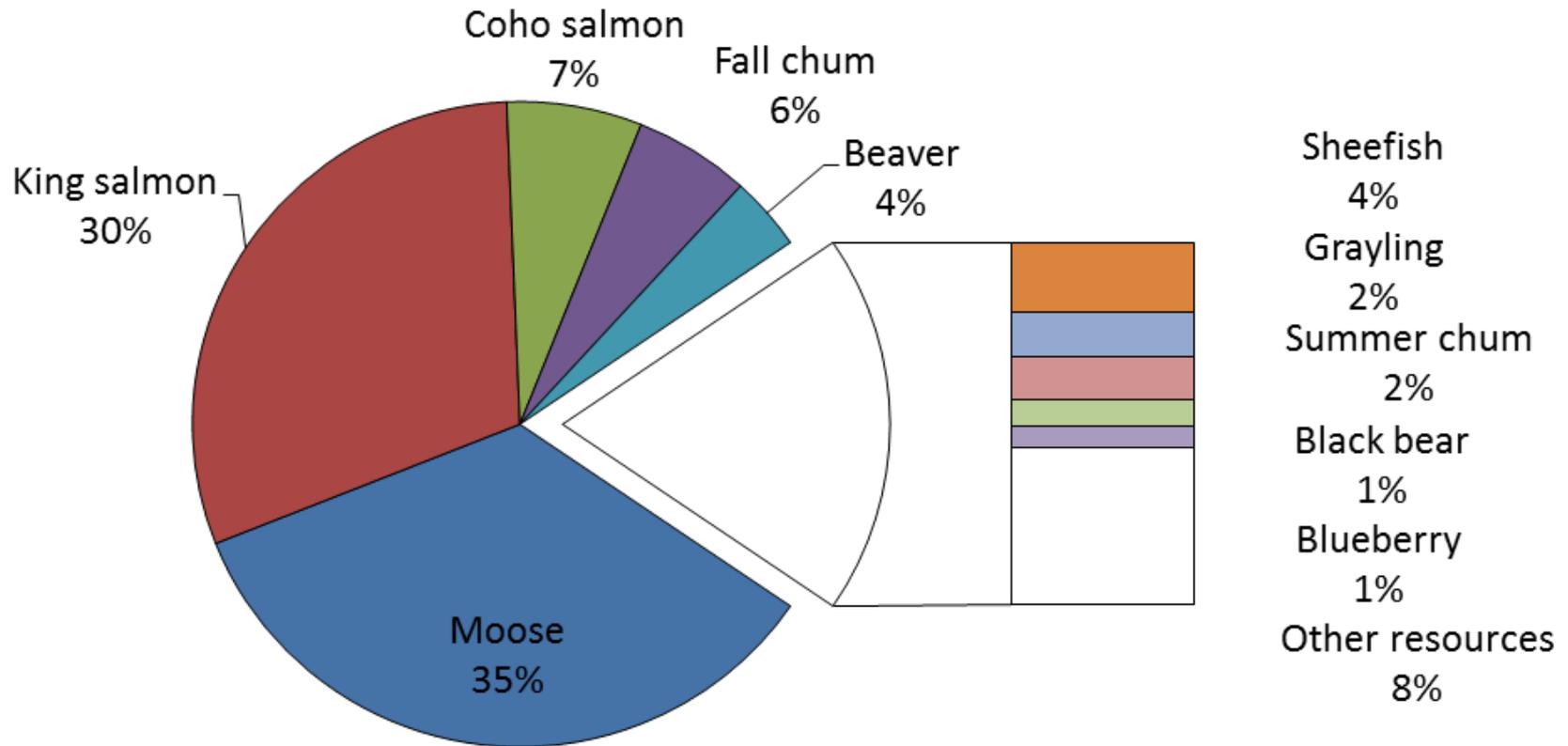
Brittany Retherford, Subsistence Resource Specialist, works with Nulato residents.

Methods (quantitative)

CUSTOMARY TRADE			
CUSTOMARY TRADE MEANS THE EXCHANGE OF SUBSISTENCE FOODS FOR CASH.			
HAVE YOU <u>EVER</u> BOUGHT OR SOLD SUBSISTENCE FOODS?			
YES (1)	NO (0)		<input type="text"/>
<i>If YES, continue below. If NO, skip to BARTER questions.</i>			
WHY HAVE YOU BOUGHT OR SOLD SUBSISTENCE FOODS?			
			<input type="text"/>
I AM GOING TO READ SOME REASONS THAT PEOPLE MIGHT <u>BUY OR SELL</u> SUBSISTENCE FOOD. PLEASE TELL ME WHICH REASONS HAVE APPLIED TO YOU.			
DID YOU BUY OR SELL SUBSISTENCE FOODS BECAUSE...	REASON APPLIES?	SINGLE MOST IMPORTANT?	
...YOU NEEDED SUBSISTENCE FOOD	Y N		<input type="text"/>
...SOMEONE ELSE NEEDED SUBSISTENCE FOOD	Y N		<input type="text"/>
...YOU NEEDED SOMETHING ELSE (NOT SUBSISTENCE FOOD)	Y N		<input type="text"/>
...SOMEONE ELSE NEEDED SOMETHING (NOT SUBS FOOD)	Y N		<input type="text"/>
...YOU HAD SOME EXTRA SUBSISTENCE FOOD	Y N		<input type="text"/>
...YOU NEEDED EXTRA CASH	Y N		<input type="text"/>
...OTHER REASON (<i>Explain</i>)	Y N		<input type="text"/>
"X" ONLY ONE!			
WHAT IS USUALLY THE SINGLE MOST IMPORTANT FACTOR IN YOUR BUYING OR SELLING FOODS?			<input type="text"/>
WHAT WAS THE <u>FIRST YEAR</u> YOU BOUGHT OR SOLD SUBSISTENCE FOOD?			YEAR <input type="text"/>
HOW OFTEN DO YOU BUY OR SELL SUBSISTENCE FOOD?			
(1)	(2)	(3)	(4)
MORE THAN ONCE A YEAR	ABOUT ONCE A YEAR	LESS THAN ONCE A YEAR	ALMOST NEVER
			<input type="text"/>
HOW OFTEN HAVE YOU BOUGHT AND THEN SOLD THE SAME SUBS. FOOD?			
<i>That is, how often are you the "middleman" in a customary trade?</i>			
(0)	(1)	(2)	
NEVER	RARELY	OFTEN	<input type="text"/>

BARTER			
"BARTER" MEANS TO EXCHANGE SUBSISTENCE FOODS FOR SOMETHING OTHER THAN CASH. HAVE YOU <u>EVER</u> BARTERED SUBSISTENCE FOODS?			
YES (1)	NO (0)		<input type="text"/>
<i>If YES, continue on this page. If NO, skip to next page.</i>			
WHY HAVE YOU BARTERED SUBSISTENCE FOODS?			
			<input type="text"/>
I AM GOING TO READ SOME REASONS THAT PEOPLE MIGHT <u>BARTER</u> SUBSISTENCE FOOD. PLEASE TELL ME WHICH REASONS HAVE APPLIED TO YOU.			
DID YOU BARTER SUBSISTENCE FOODS BECAUSE...	REASON APPLIES?	SINGLE MOST IMPORTANT?	
...YOU NEEDED SUBSISTENCE FOOD	Y N		<input type="text"/>
...SOMEONE ELSE NEEDED SUBSISTENCE FOOD	Y N		<input type="text"/>
...YOU NEEDED SOMETHING ELSE (NOT SUBSISTENCE FOOD)	Y N		<input type="text"/>
...SOMEONE ELSE NEEDED SOMETHING (NOT SUBS FOOD)	Y N		<input type="text"/>
...YOU HAD SOME EXTRA SUBSISTENCE FOOD	Y N		<input type="text"/>
...OTHER REASON (<i>Explain</i>)	Y N		<input type="text"/>
...OTHER REASON (<i>Explain</i>)	Y N		<input type="text"/>
"X" ONLY ONE!			
WHAT IS USUALLY THE SINGLE MOST IMPORTANT FACTOR IN YOUR BARTERS? ("X" one factor only)			<input type="text"/>
WHAT WAS THE <u>FIRST YEAR</u> YOU BARTERED SUBSISTENCE FOODS?			YEAR <input type="text"/>
HOW OFTEN DO YOU BARTER SUBSISTENCE FOODS?			
(1)	(2)	(3)	(4)
MORE THAN ONCE A YEAR	ABOUT ONCE A YEAR	LESS THAN ONCE A YEAR	ALMOST NEVER
			<input type="text"/>
HOW OFTEN HAVE YOU BARTERED THE SAME SUBS FOODS MORE THAN ONCE?			
<i>That is, how often are you the "middleman" in a barter?</i>			
(0)	(1)	(2)	
NEVER	RARELY	OFTEN	<input type="text"/>

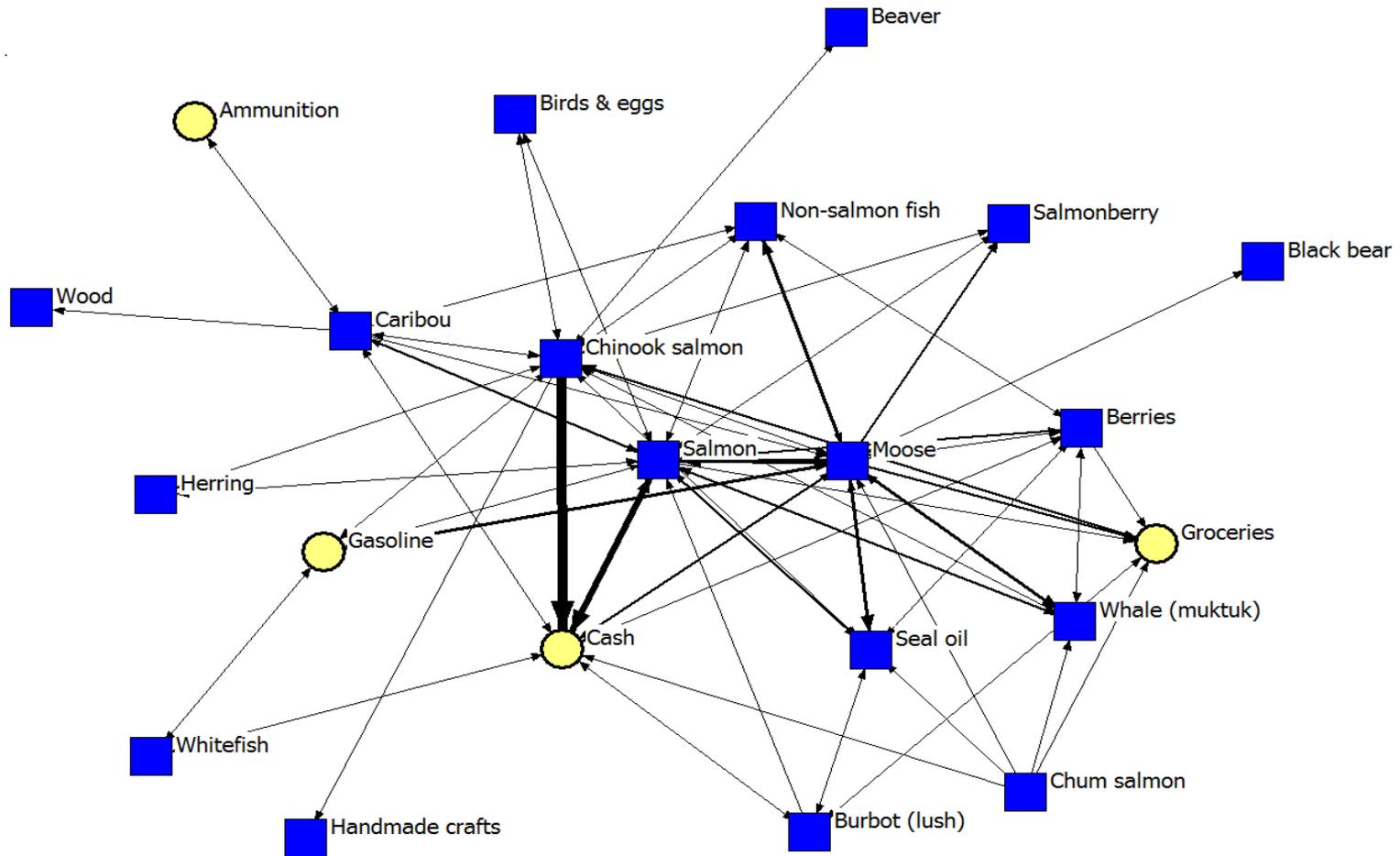
Preliminary Findings



Nulato, 2011

- 60% of households harvested king salmon
- 87% of households used king salmon
- 73 lbs per capita

Preliminary Findings



All Communities

Preliminary Findings

1. Decline in fish camp use (obj. a, b, c)
Important site of cultural, economic, nutritional, and educational values.
2. Wage labor and subsistence (obj. a)
Challenge of balancing schedules of wage employment with need for cash to support subsistence activities.
3. Cost of fuel (obj. a, b, c)
Compounds problems caused by declining salmon: need to use more gas to get fewer fish.

Preliminary Findings

4. Regulations (obj. a, c)

Restrictions, while important for conservation, decrease fishing efficiency and opportunity.

5. Dogs (obj. a, c)

Restrictions can interfere with harvesting fish for dogs; gear shifts away from fish wheels magnify effects of king salmon decline.

6. Alternative resources (obj. c)

Not always available or accessible because of regulations or increased costs of harvesting.

Preliminary Findings

Eagle resident jars salmon for the winter.



Two girls at a family fish camp 50 miles downriver of Eagle.



Summary

- Strong reliance on subsistence salmon harvests.
- Broad support for the role of exchange networks.
- Concerns over ability to obtain sufficient amounts of salmon.

Questions?



Western Alaska Salmon Stock Identification Program (WASSIP):

Understanding harvest patterns of chum
and sockeye salmon stocks from a large
scale genetics project, with focus on AYK



Eric Volk, Bill Templin, Chris Habicht,
Andrew Munro and Doug Eggers
RC 7, Tab 8

WASSIP Signatories

- *Alaska Department of Fish and Game*
- *Aleut Corporation*
- *Aleutians East Borough*
- *Association of Village Council Presidents*
- *Bering Sea Fishermen's Association*
- *Bristol Bay Native Association*
- *Concerned Area M Fishermen*
- *Kawerak Incorporated*
- *Lake and Peninsula Borough*
- *Tanana Chiefs Conference*
- *Yukon River Drainage Fisheries Association*



WASSIP Purpose

Identify stock contributions of sockeye and chum salmon to subsistence and commercial fisheries in Western Alaska, from the Chignik management area north to Kotzebue Sound, with the finest resolution possible. To the extent practicable, extend stock contribution estimates to stock-specific harvest rates.

Better genetic resolution of Western Alaska chum stocks: a central goal of WASSIP

- Previous studies did not provide necessary information to resolve issues important to AYK stakeholders
- Widely held regional notion that fisheries outside of AYK represent conservation concern for AYK chum salmon
- Norton Sound districts 1,2,3: stocks of yield concern

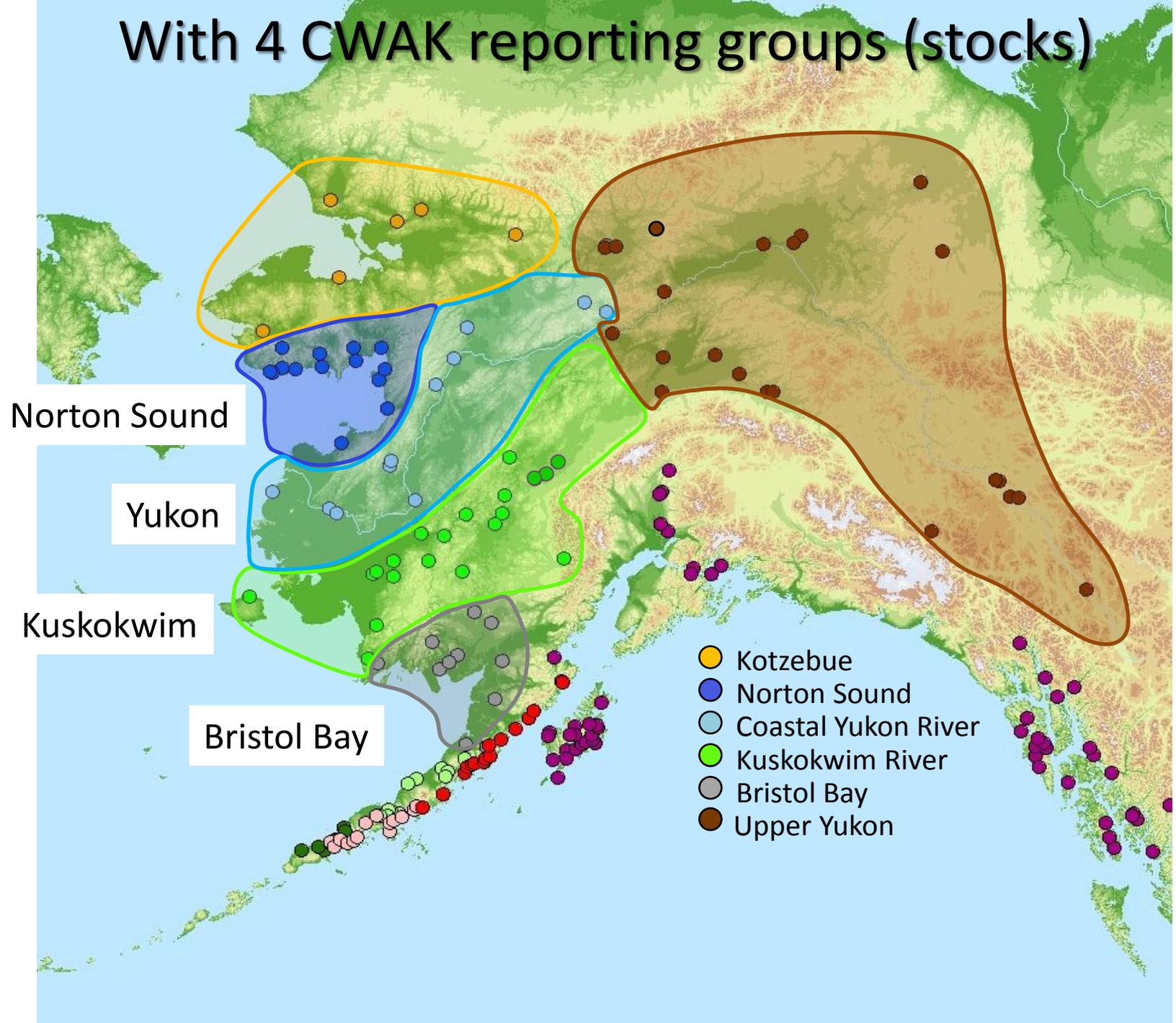
WASSIP efforts to resolve among CWAK stocks

- Increased the number of genetic markers
- Added 97 baseline populations for Western Alaska to make sure that all variation was represented
- Worked with AP to make sure that the reporting groups were useful to stakeholders
- Reviewed by technical experts (TC)

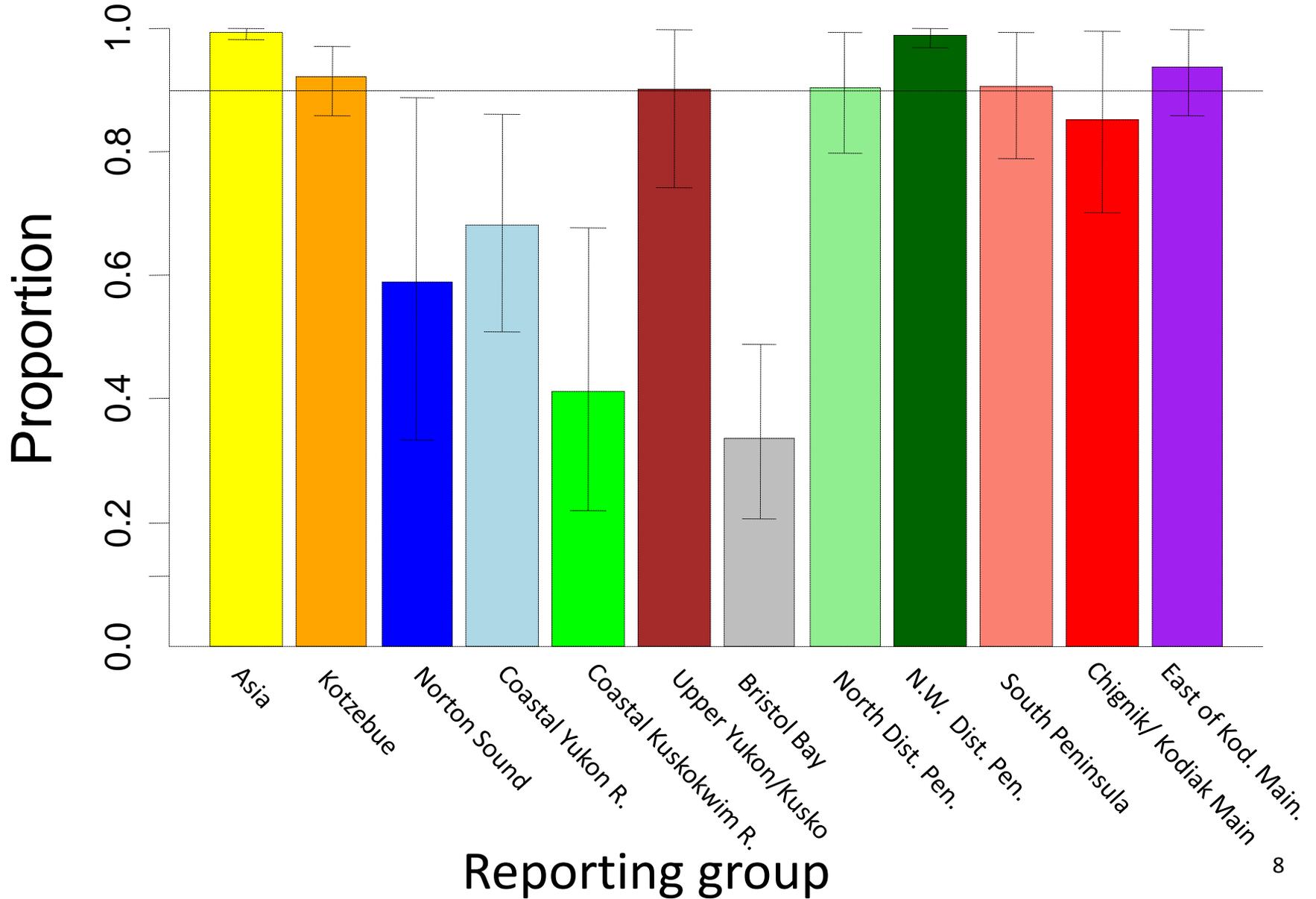
Priorities for Stakeholders

- Strive for four major reporting groups
 - Norton Sound, Yukon, Kuskokwim, Bristol Bay
- or
- Distinguish AYK from Bristol Bay
- and/or
- Distinguish Norton Sound from Yukon and Kuskokwim

With 4 CWAK reporting groups (stocks)

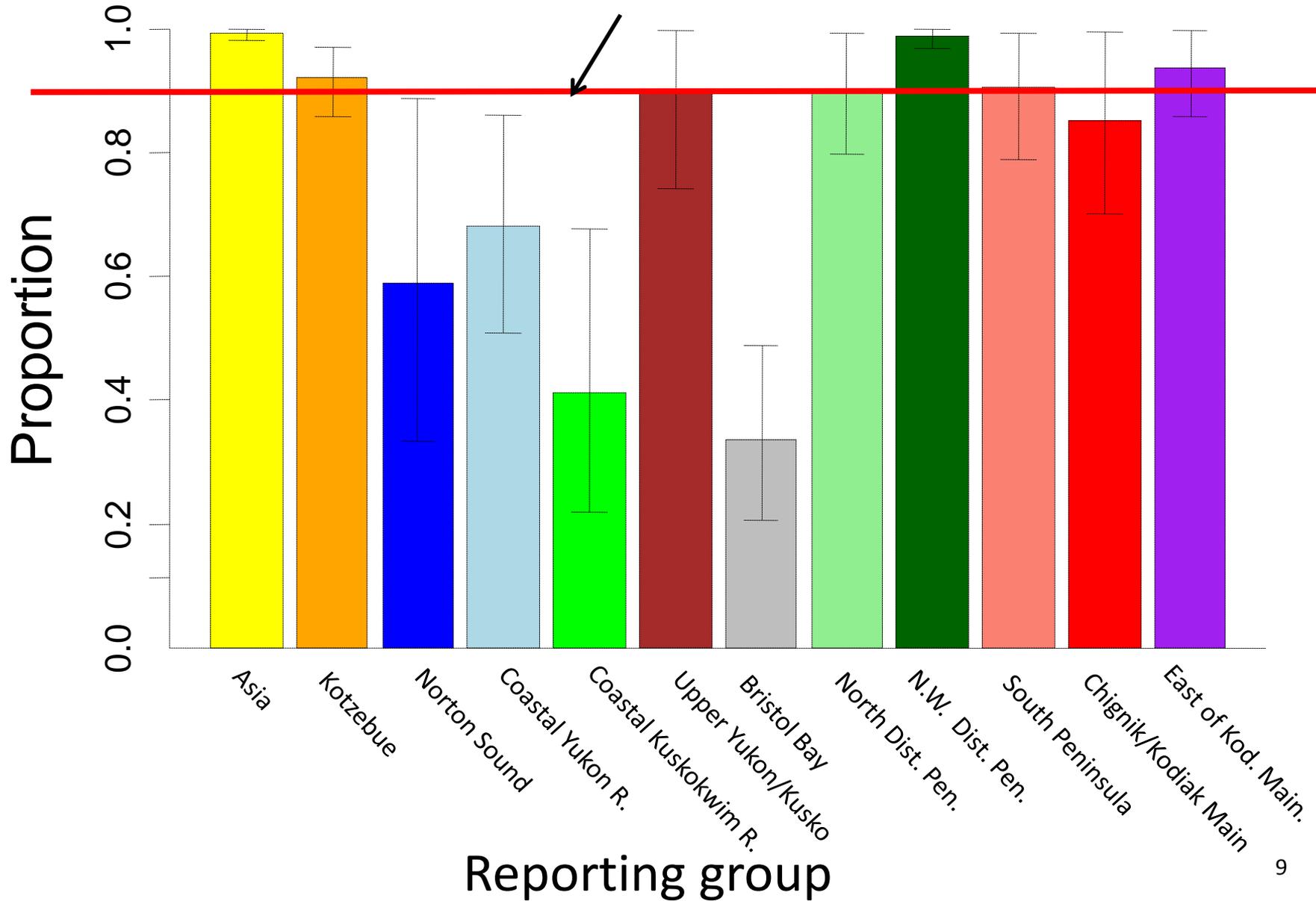


100% Proof Tests; CWAK divided into 4 groups

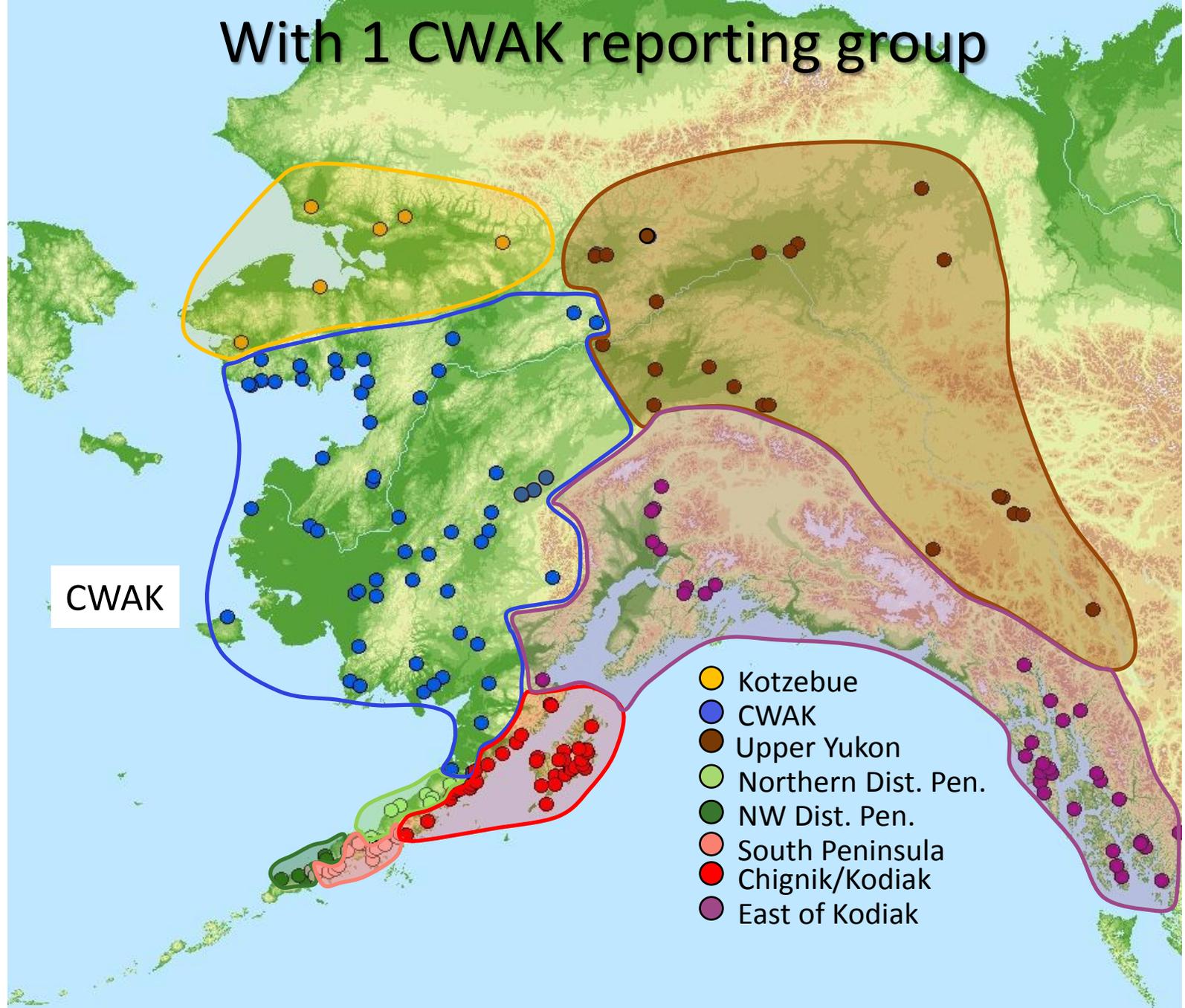


100% Proof Tests; CWAK divided into 4 groups

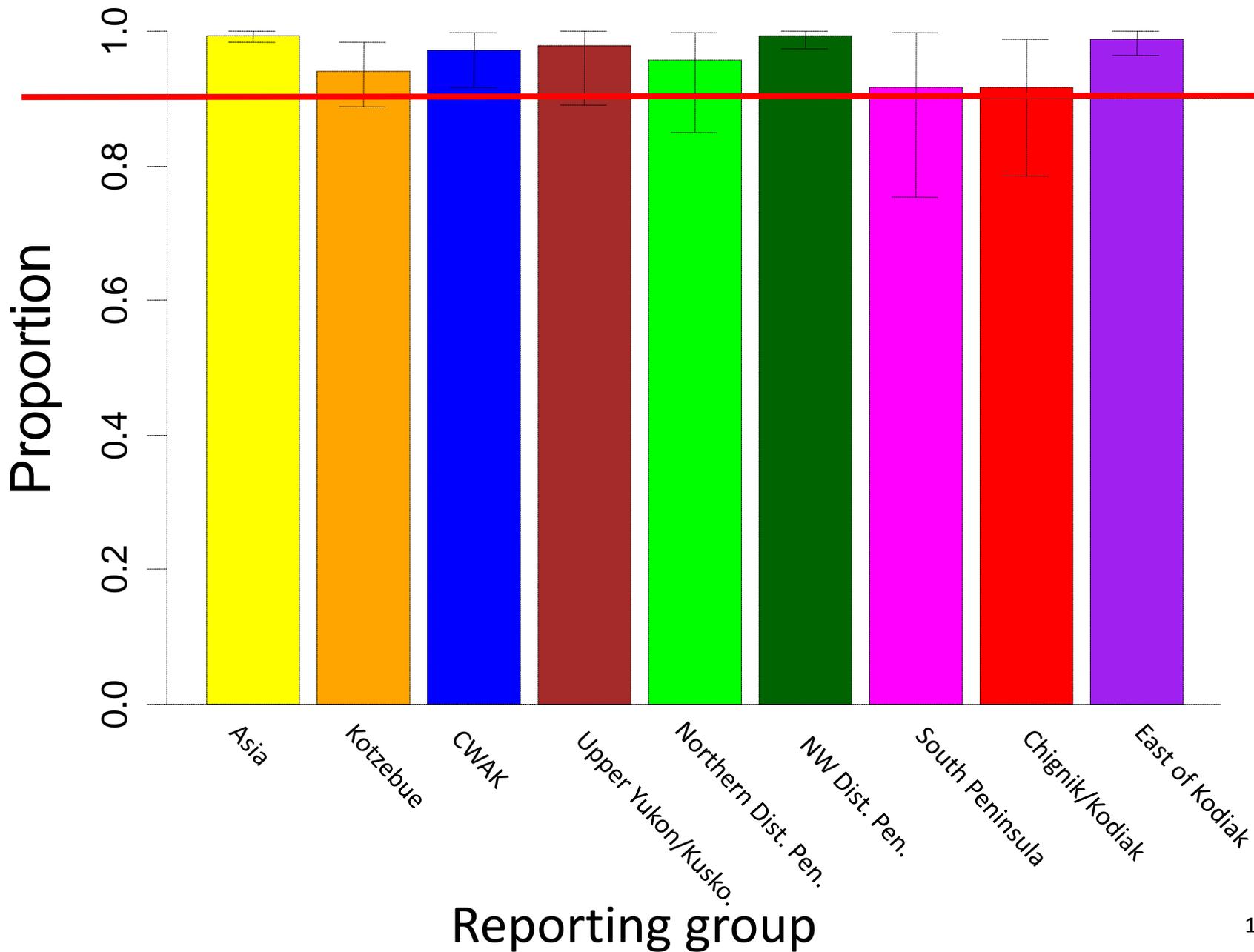
90% criterion



With 1 CWAK reporting group



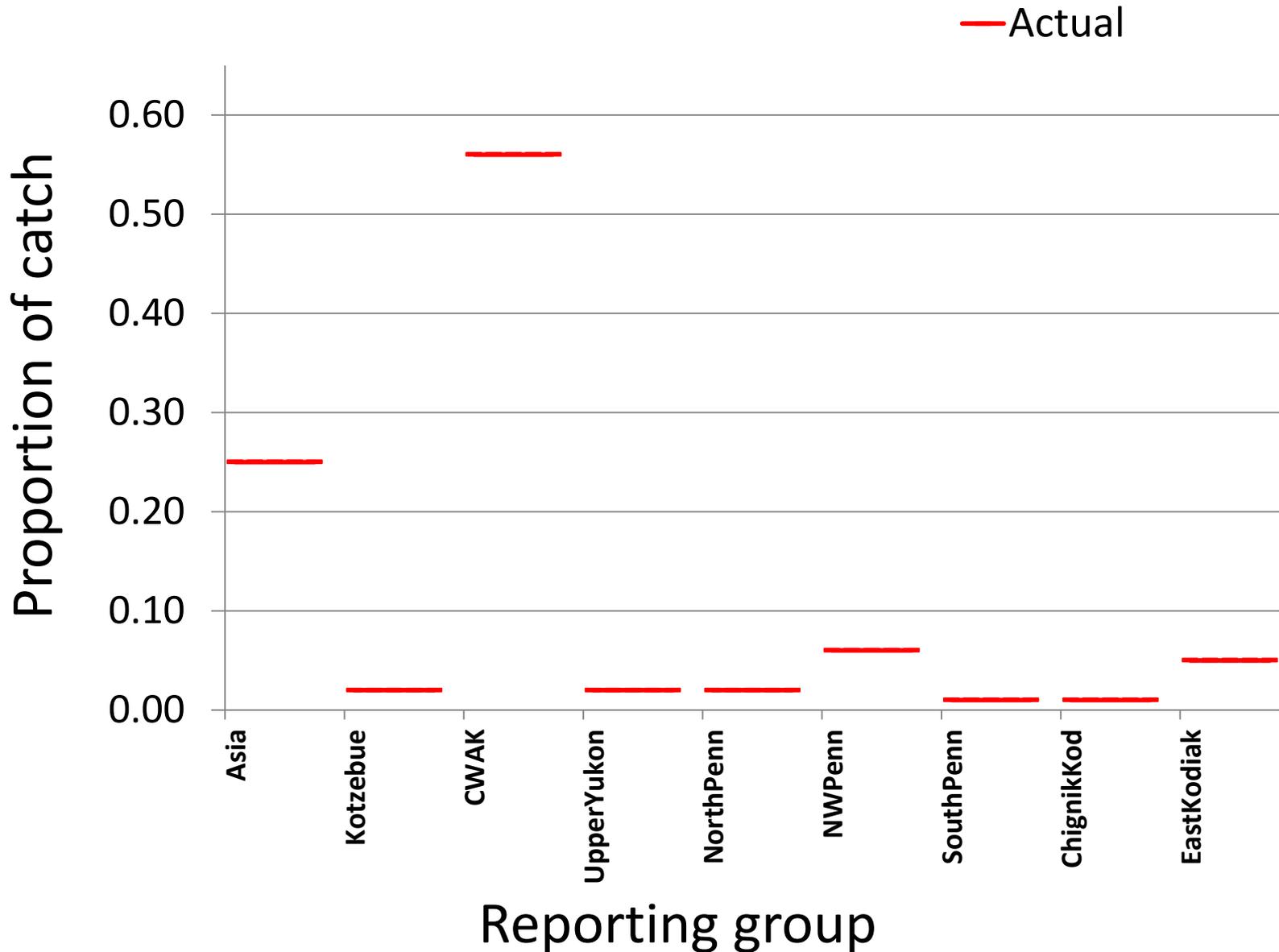
100% Proof Tests; CWAK as 1 group



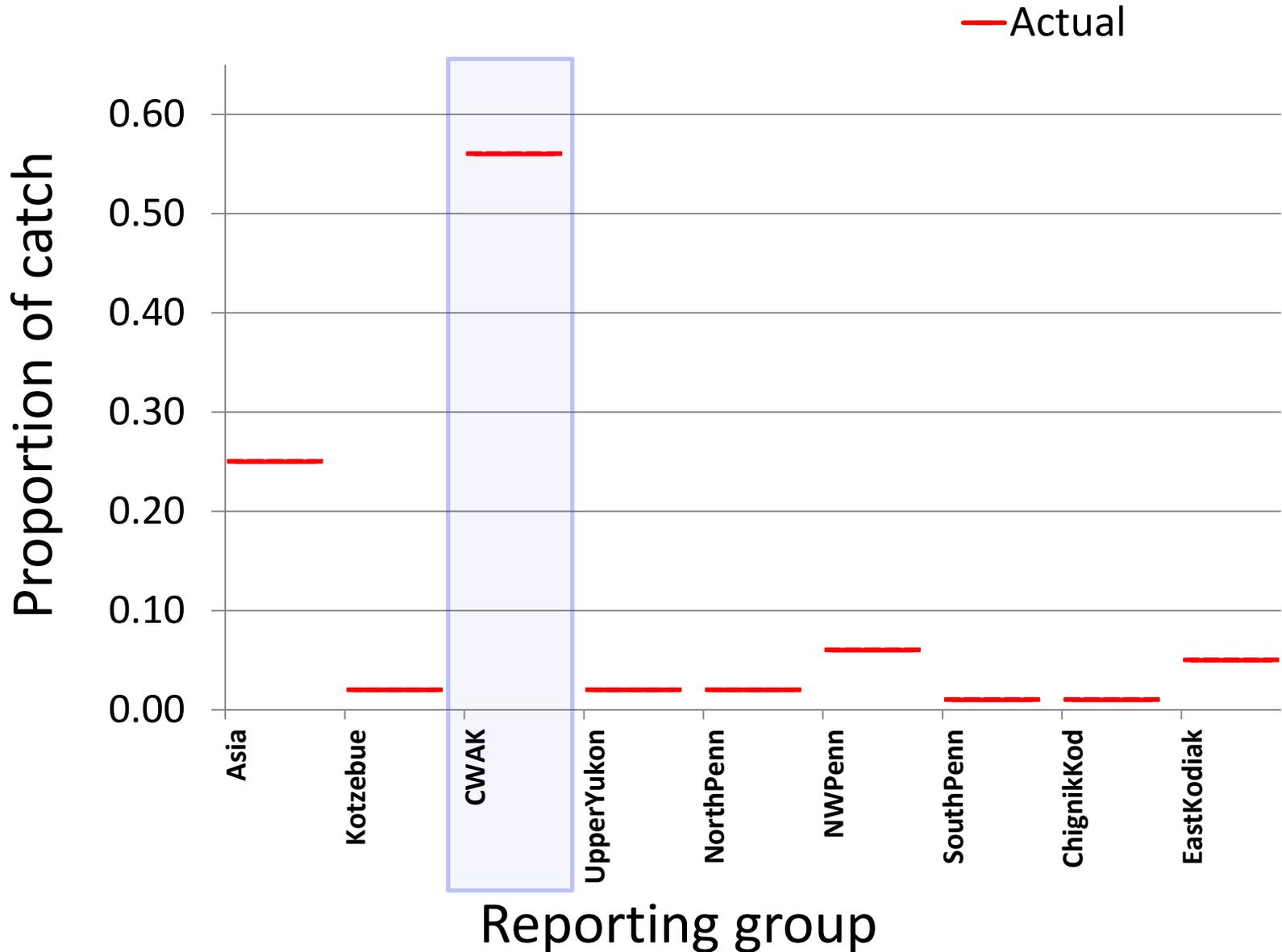
Technical Document 15; “Chum salmon reporting group evaluations using simulated fishery mixtures”

- AP questioned whether reporting groups that did not meet the 90% criterion could still be useful
- Department asked to analyze simulated fishery mixtures to investigate performance
- The *AP ad hoc* committee provided realistic stock proportions for analysis

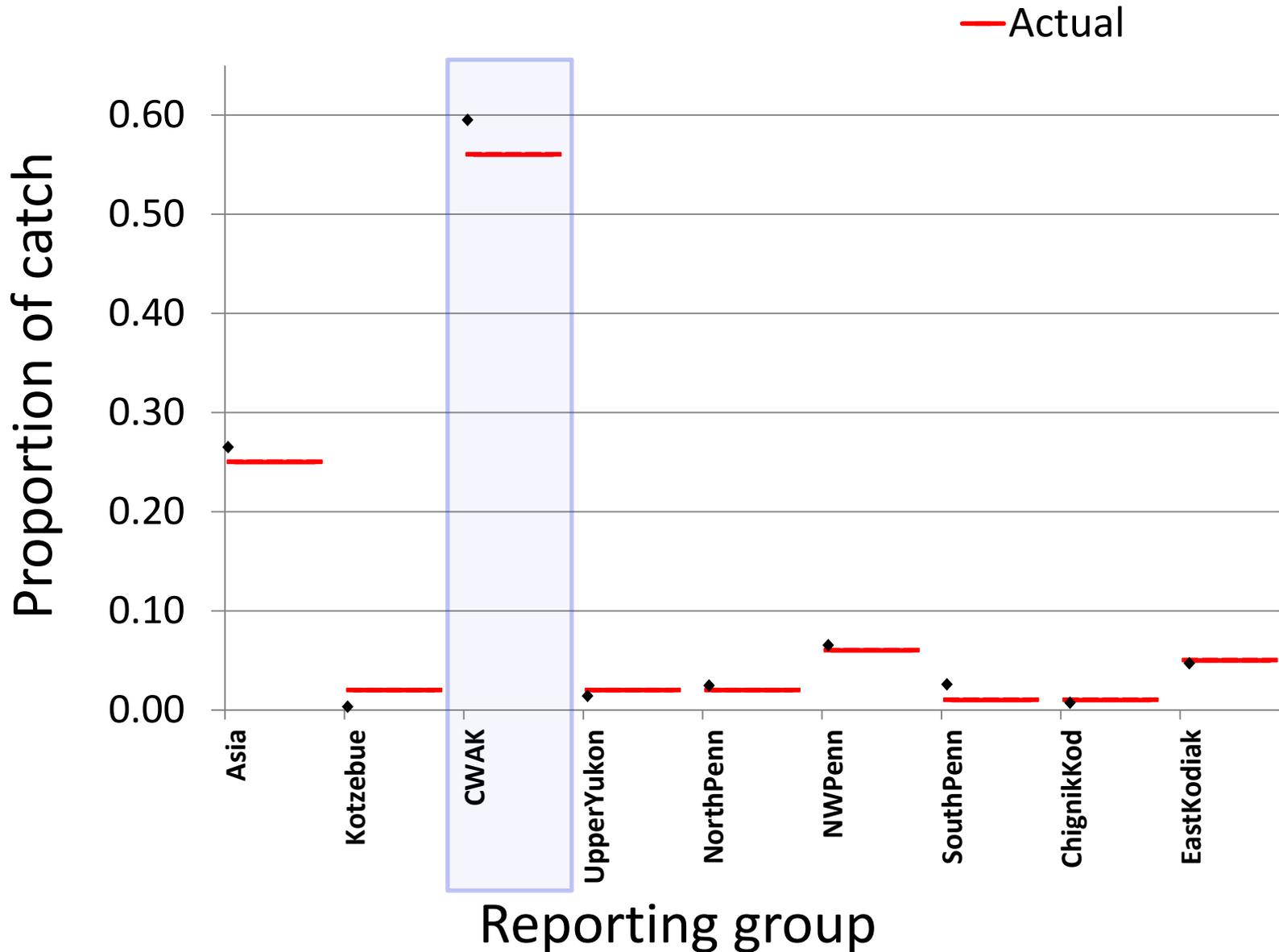
Simulated fishery 1; South Peninsula (June)



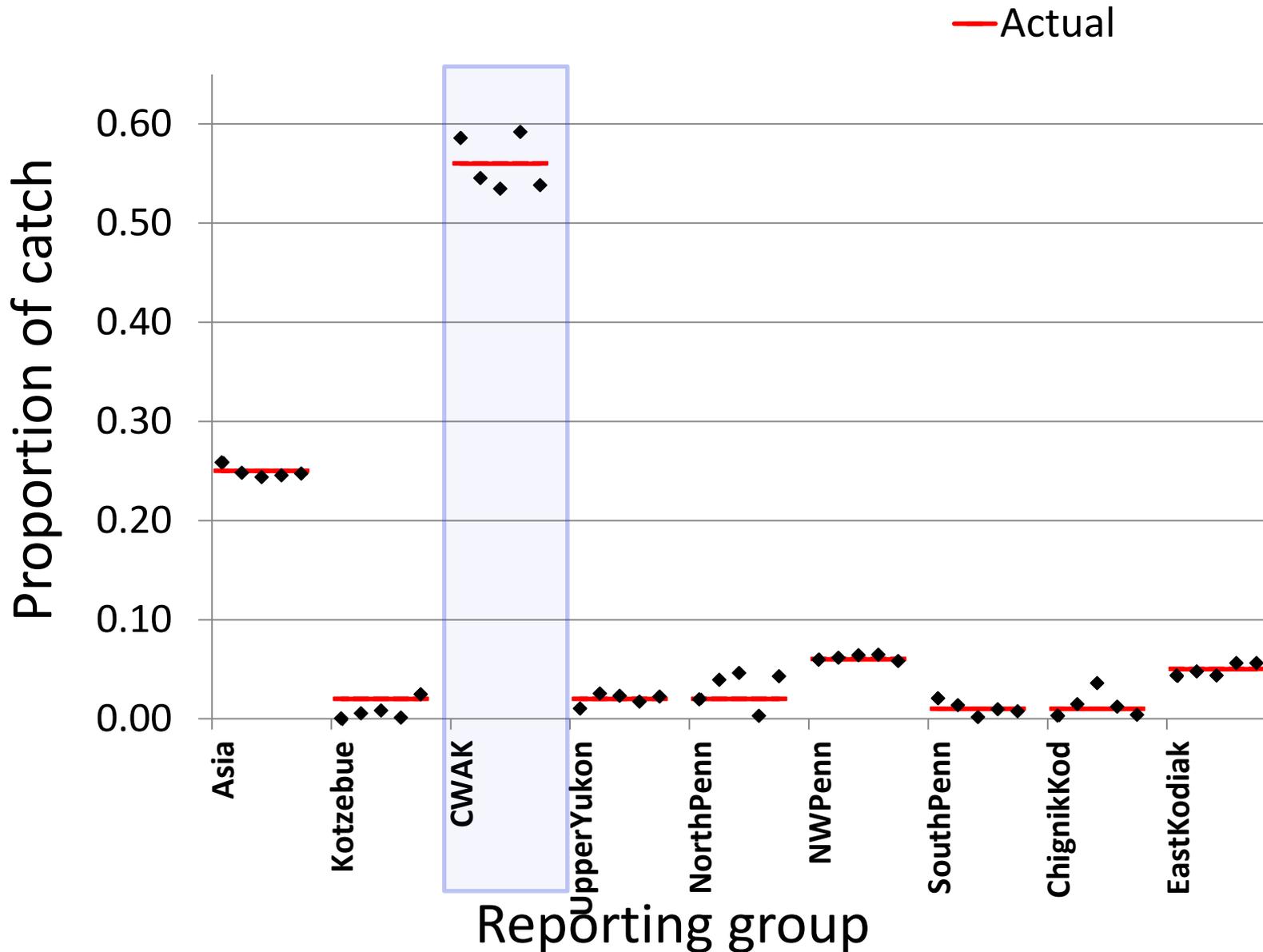
Simulated fishery 1; South Peninsula (June)



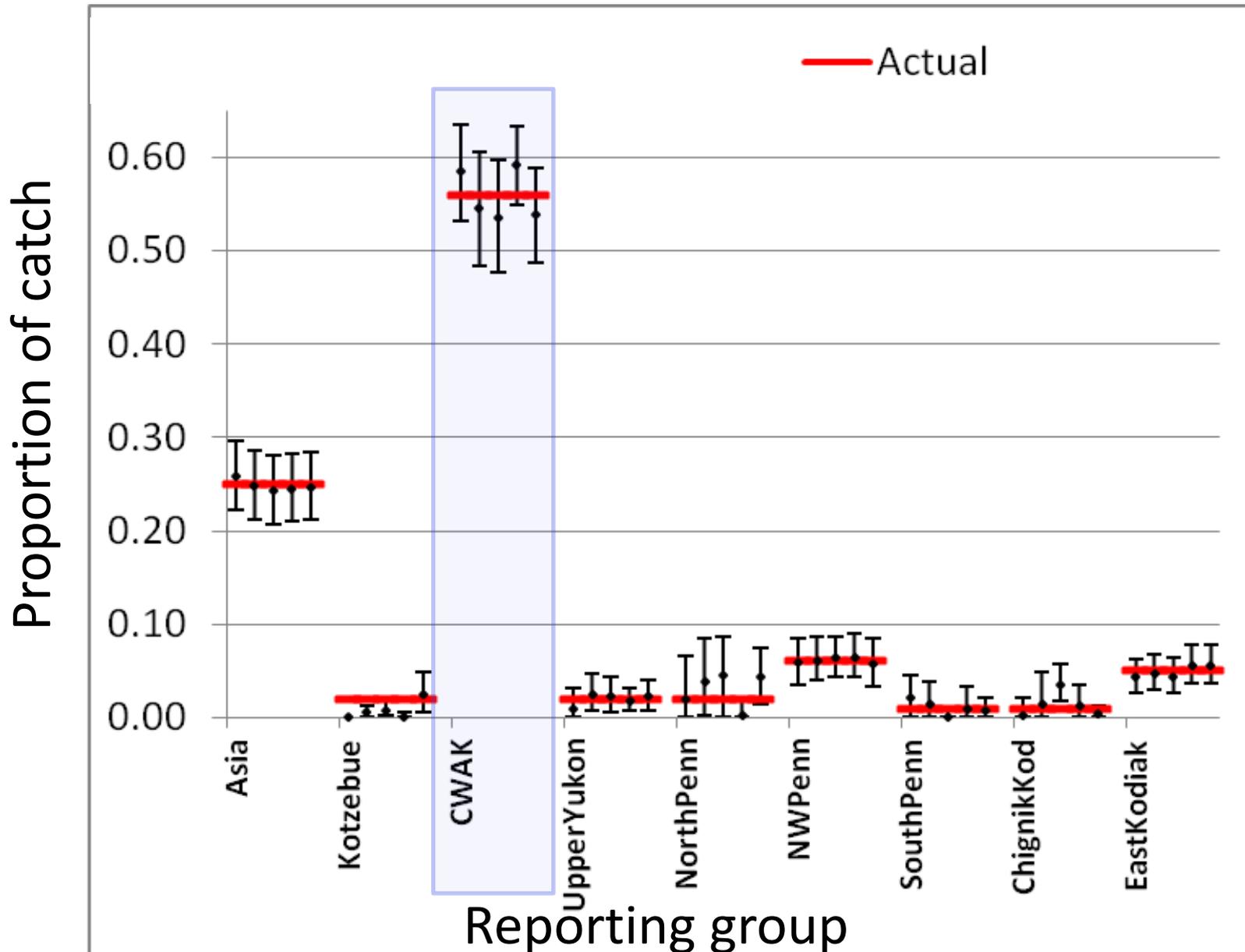
Simulated fishery 1; South Peninsula (June)



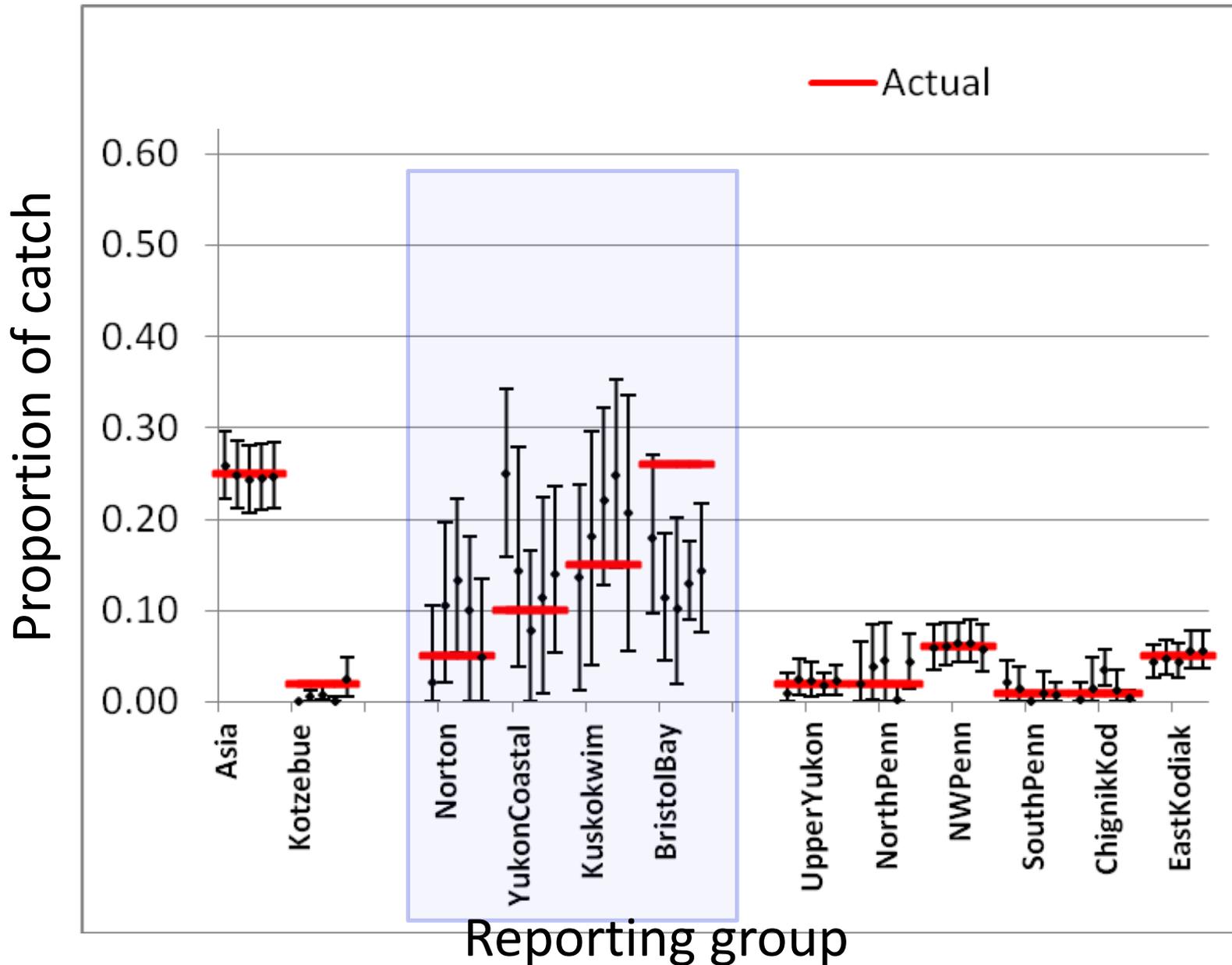
Simulated fishery 1; South Peninsula (June)



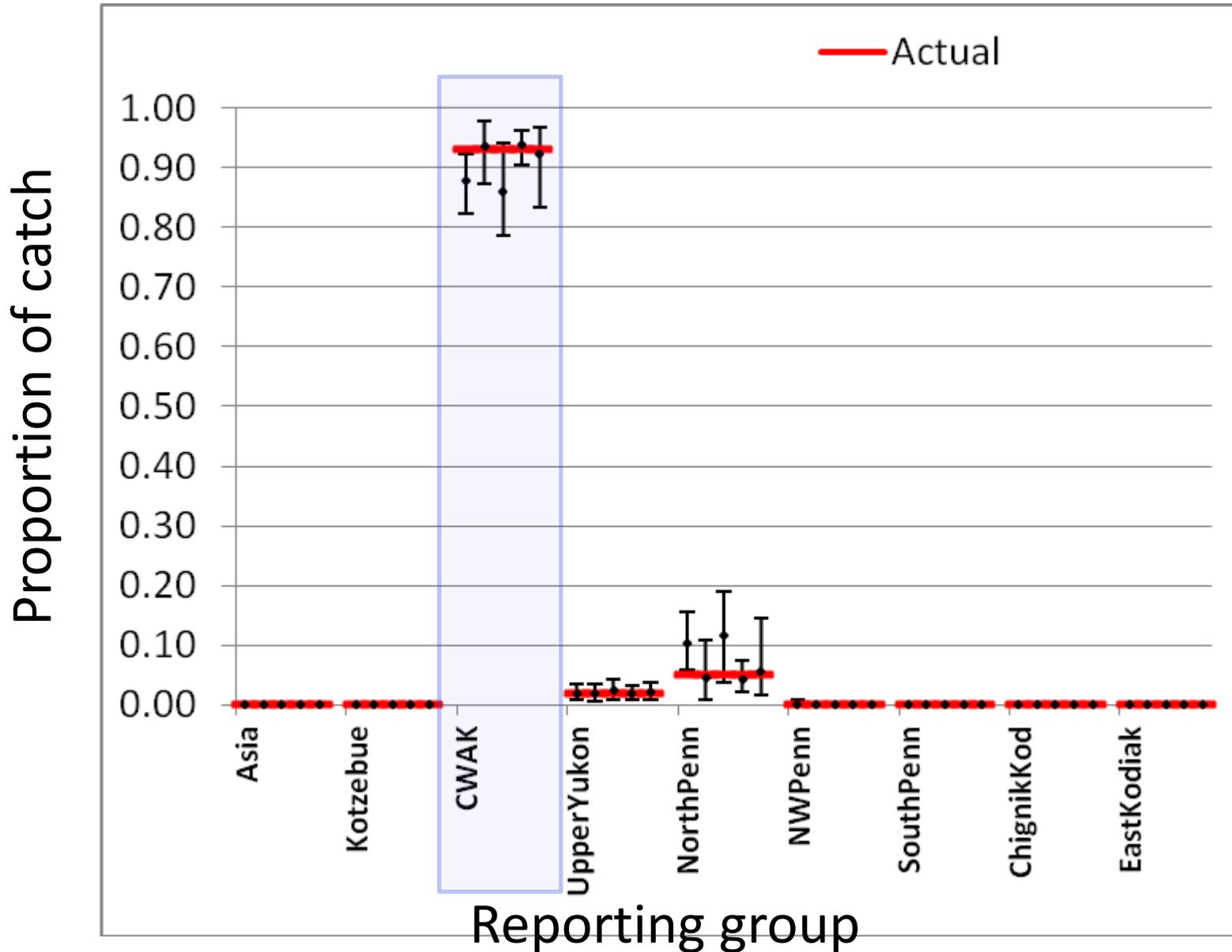
Simulated fishery 1; South Peninsula (June)



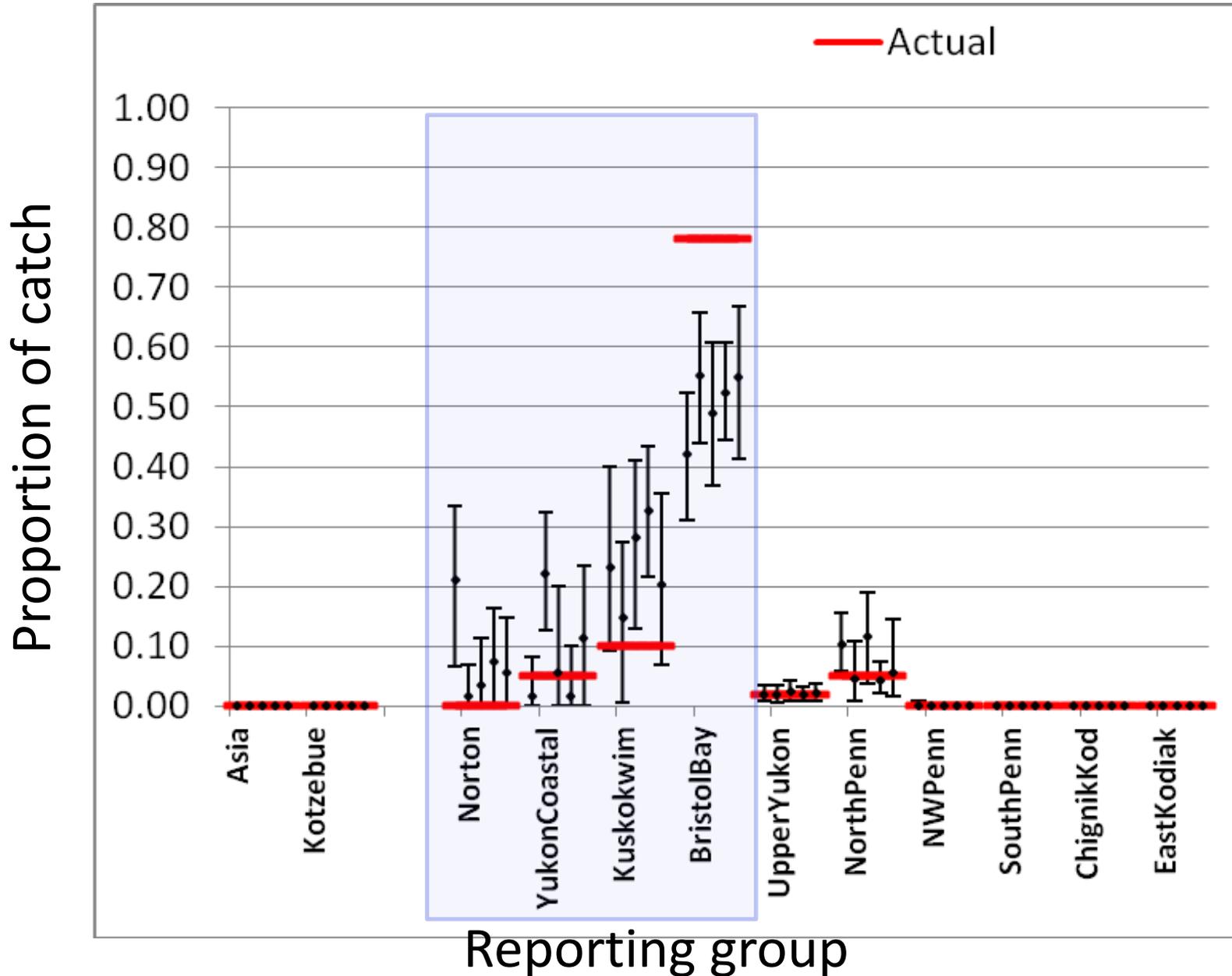
Simulated fishery 1; South Peninsula (June)



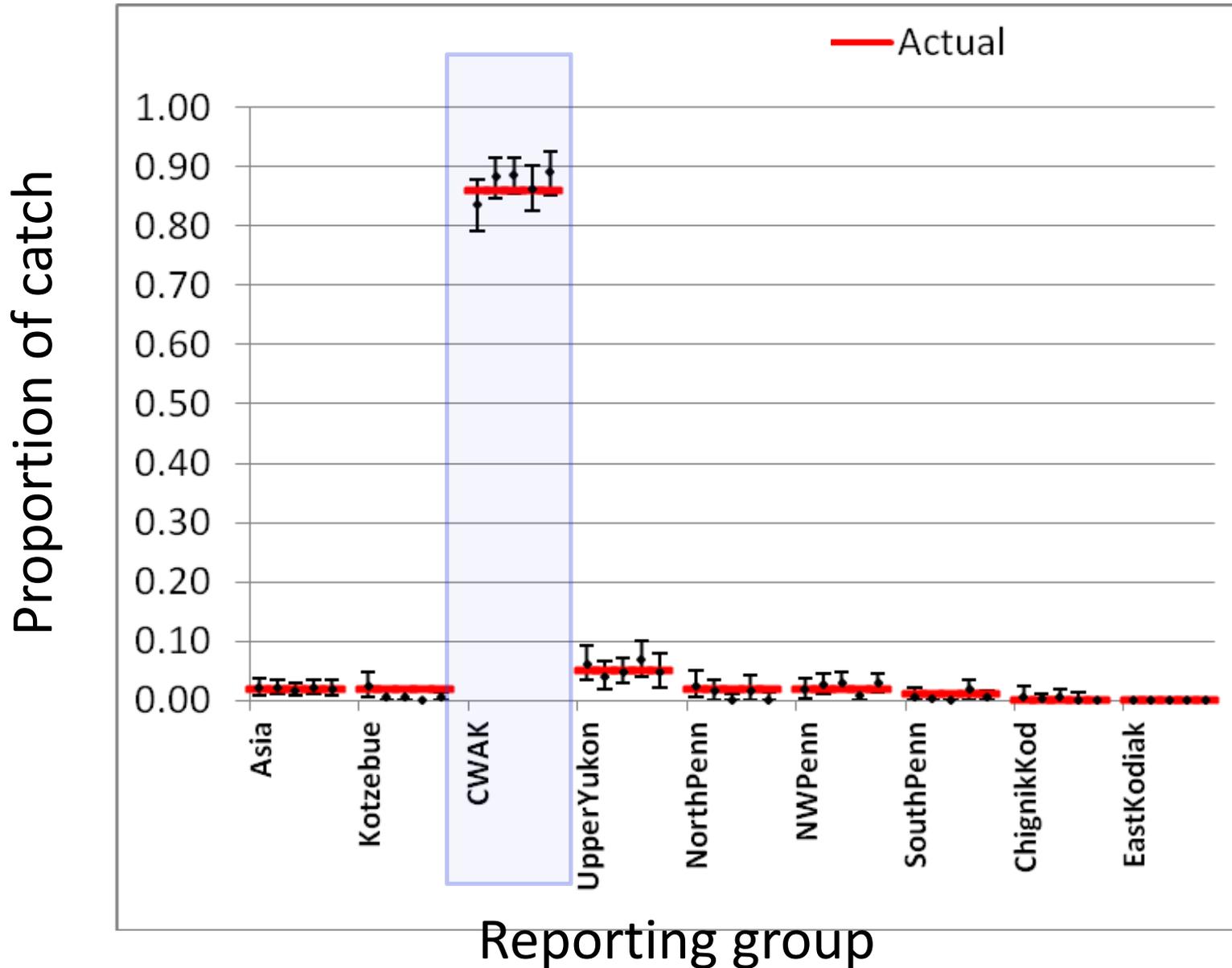
Simulated fishery 2; Bristol Bay



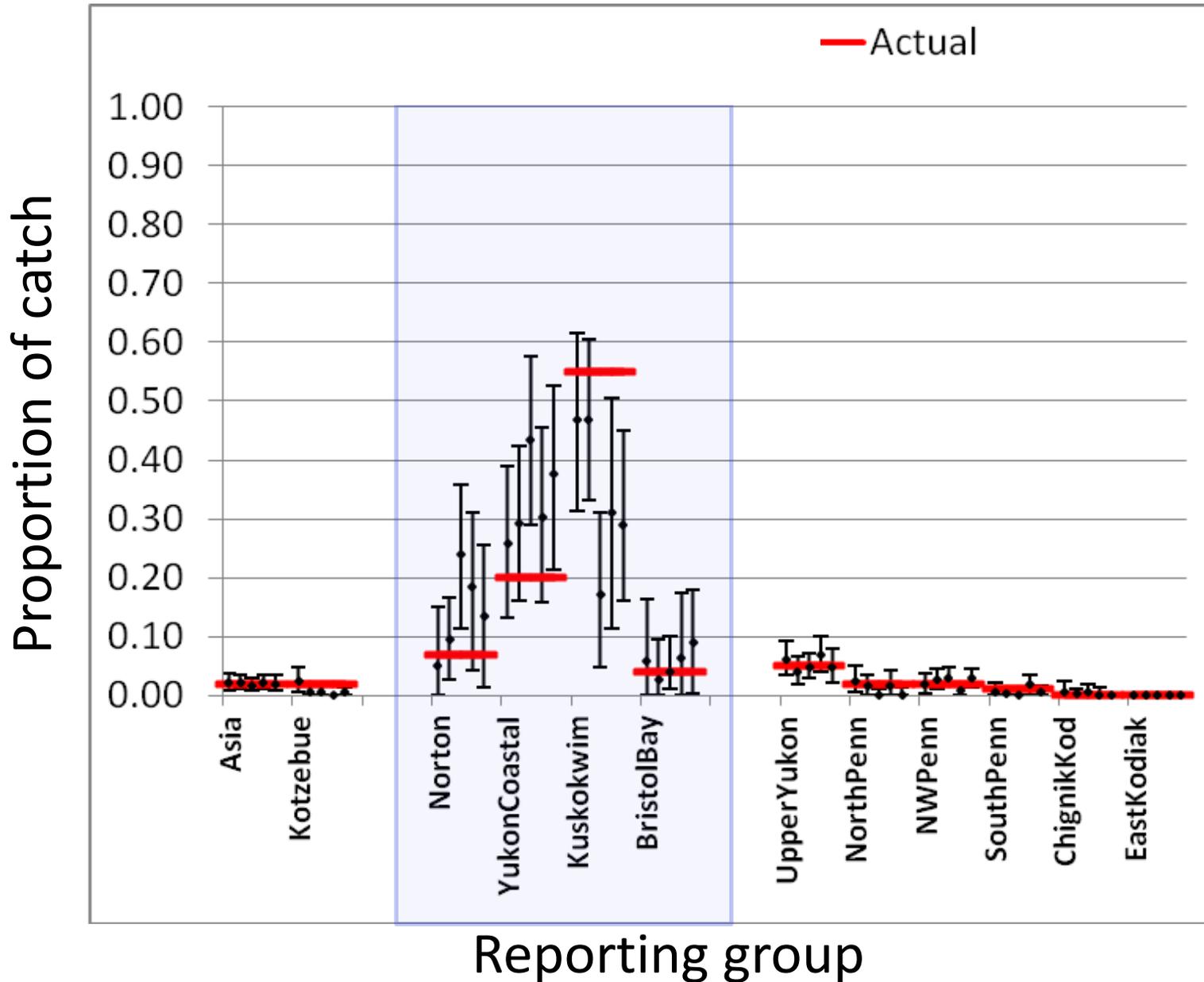
Simulated fishery 2; Bristol Bay



Simulated fishery 3; Kuskokwim Bay



Simulated fishery 3; Kuskokwim Bay



CWAK take-home messages

- Analysis of simulated mixtures supports the 90% criterion of proof test
- Combined CWAK reporting group performed well
- Subdivided CWAK reporting groups performed poorly: imprecise and inaccurate
- AP agreed combined CWAK reporting group was most defensible

Where do we go from here – CWAK?

- Genetic variation exists among CWAK stocks
- Continued research
 - Western Alaska Salmon Coalition
 - ADF&G
 - UAF
 - NOAA
- Additional markers
- Refined statistical methods



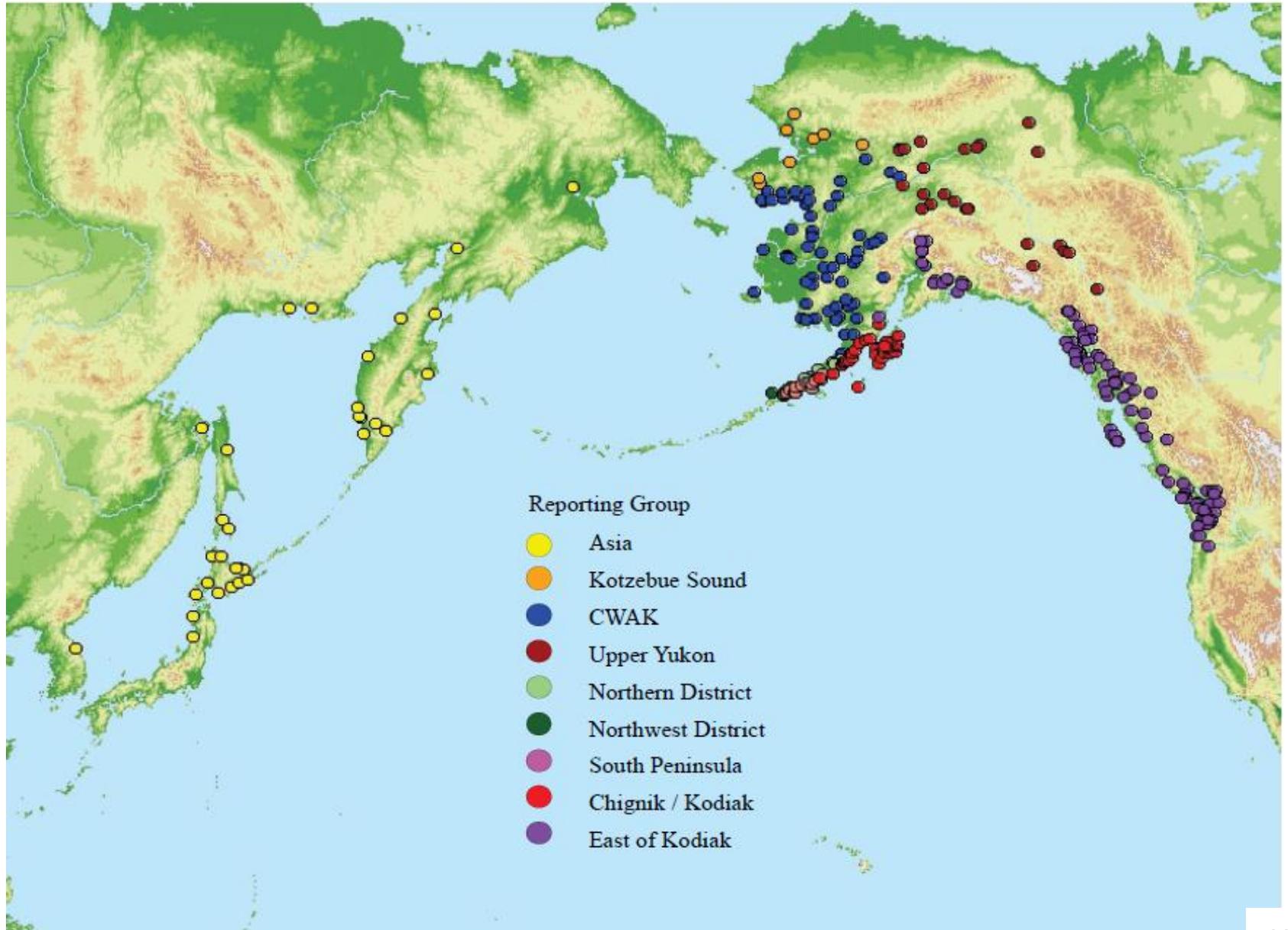
What questions are we answering:

- What stocks are caught in a given fishery?
 - What are the stock compositions through time?
 - How do these translate to numbers of fish?
 - How do these translate to the proportion of the run?
 - How do these vary by fine-scale and broad-scale fisheries?
- What fisheries catch a given stock?
 - Where and when is a given stock caught in different fisheries?
 - What proportion of the total return do these catches represent?

Chum salmon results



Baseline reporting groups; chum salmon



Where to find stock definitions for chum salmon

Special Publication No. 12-26

Chum Salmon Baseline for the Western Alaska Salmon Stock Identification Program

by

Nicholas A. DeCovich,
Tyler H. Dann,
Serena D. Rogers Olive,
Heather L. Liller,
Elisabeth K.C. Fox,
James R. Jasper,
Erica L. Chenoweth,
Christopher Habicht,
and
William D. Templin

November 2012

Alaska Department of Fish and Game

Division of Sport Fish and Commercial Fisheries



- SP 12-26
- Figures: 3 – 5
- Table: 1
- Order: Starts in Asia, ends in Washington

What stocks are caught in a given fishery?

Goodnews District commercial stock compositions

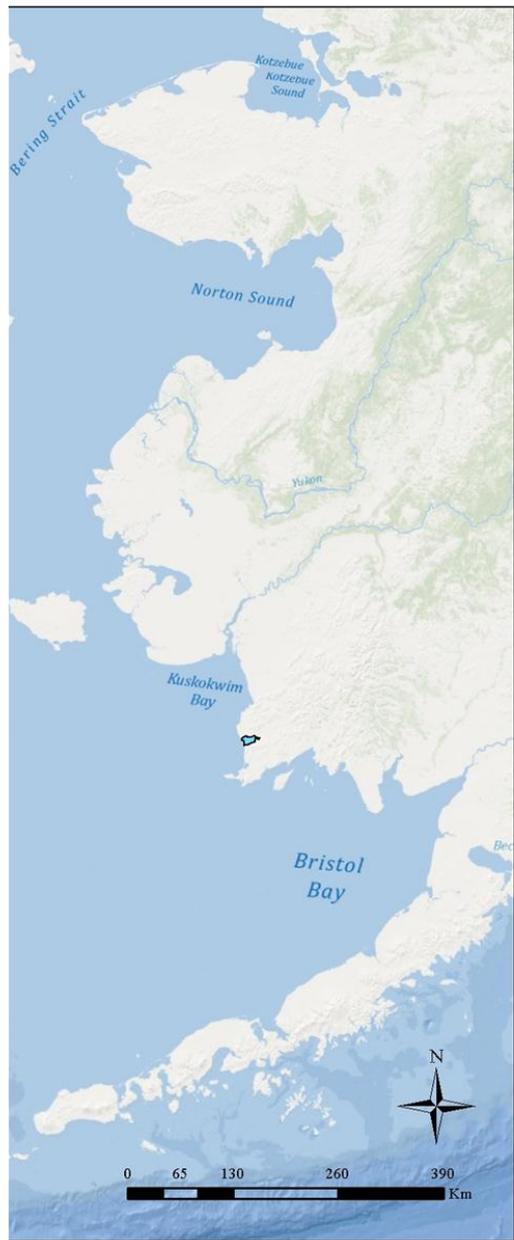


Figure 17.–

Goodnews District commercial stock compositions

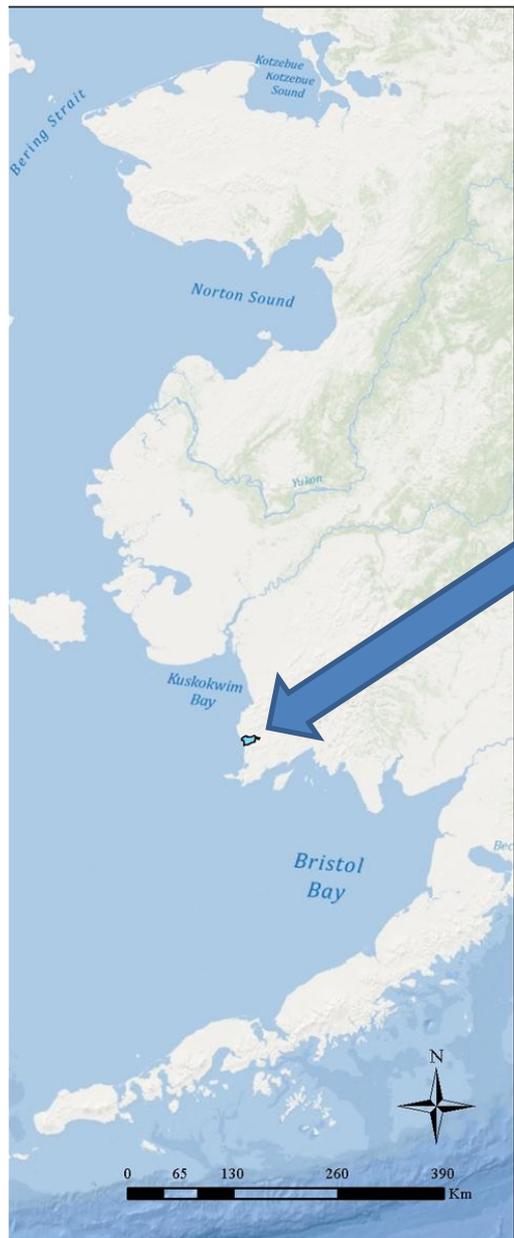


Figure 17.–

Goodnews District commercial stock compositions

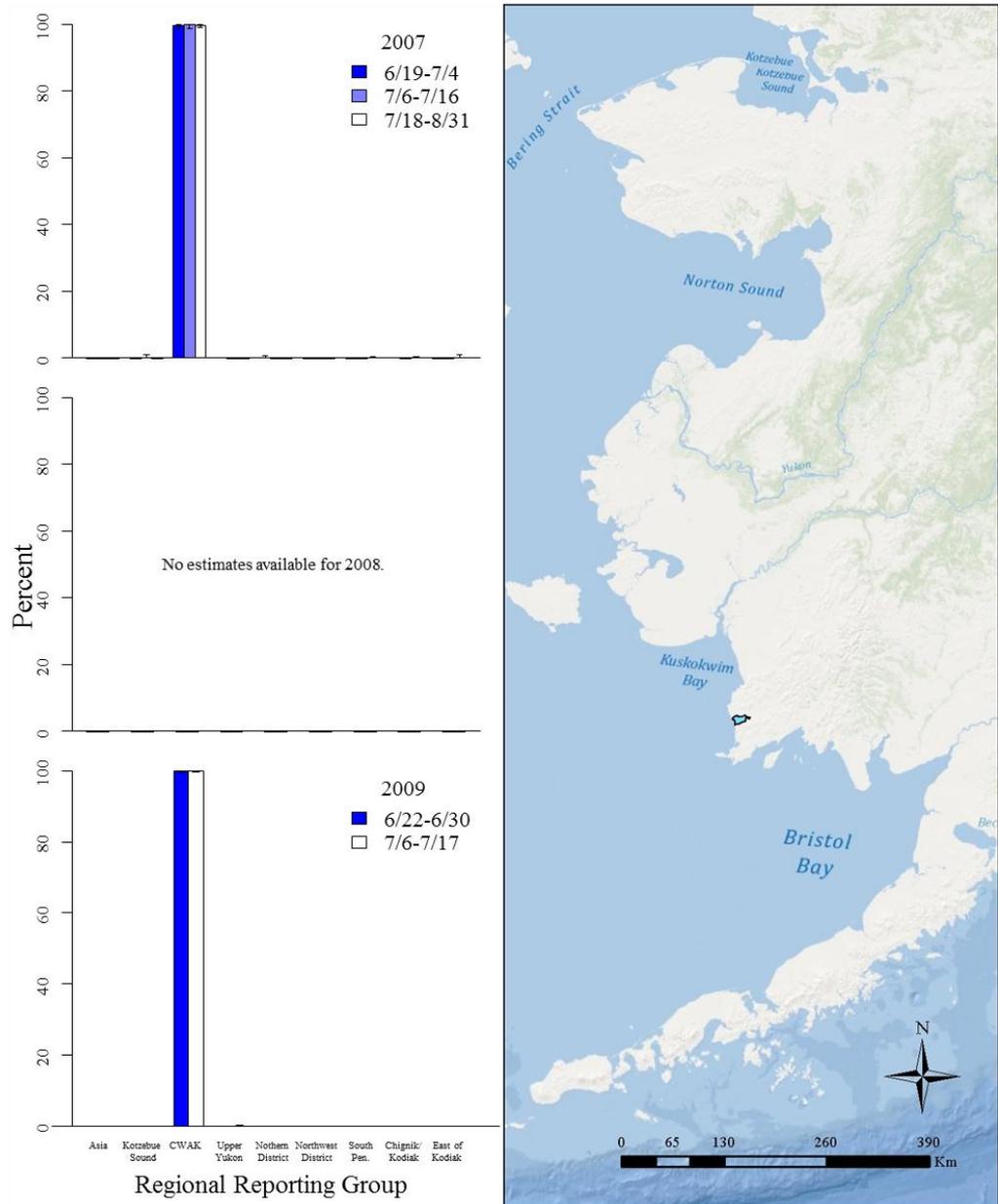


Figure 17.—

Regional Reporting Group

Where to find stock composition rates for a given fishery (chum salmon)

Special Publication No. 12-23

Stock Composition of Chum Salmon Harvests in Fisheries of the Western Alaska Salmon Stock Identification Program (WASSIP), 2007-2009

by
William D. Templin,
Nicholas A. DeCovich,
Serena D. Rogers Olive,
Heather L. Liller,
Elisabeth K.C. Fox,
James R. Jasper,
Mark J. Witteveen,
Tim T. Baker,
Kathrine G. Howard,
Andrew R. Munro,
Eric C. Volk
and
Christopher Habicht

November 2012

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



- SP 12-23
- Figures: 2 – 35
- Tables: 2 – 62
 - Tabulated data shown in figures
- Order: Starts in Chignik, ends in Kotzebue

Goodnews District commercial harvest numbers

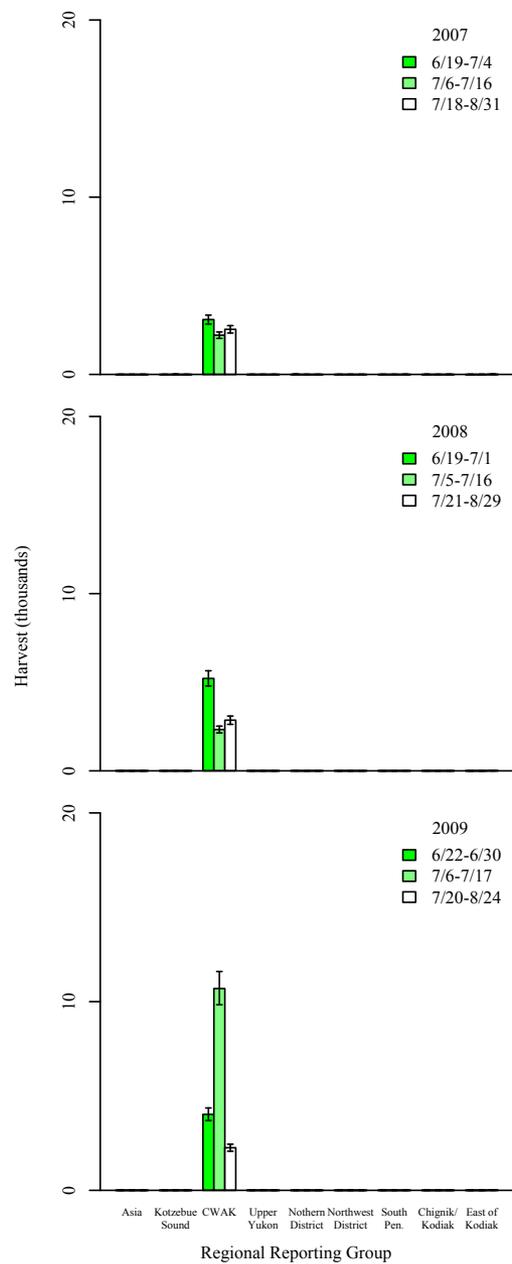


Figure 20.-

Where to find stock-specific harvest numbers for a given fishery (chum salmon)

Special Publication No. 12-25

**Harvest and Harvest Rates of Chum Salmon Stocks
in Fisheries of the Western Alaska Salmon Stock
Identification Program (WASSIP), 2007–2009**

by

Andrew R. Munro,
Christopher Habicht,
Tyler H. Dann,
Douglas M. Eggers,
William D. Templin,
Mark J. Witteveen,
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Eric C. Volk

November 2012

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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- Appendices: C1 - C266
 - Tabulated data shown in figures
- Order: Starts in Chignik, ends in Kotzebue

Goodnews District commercial districts harvest rates

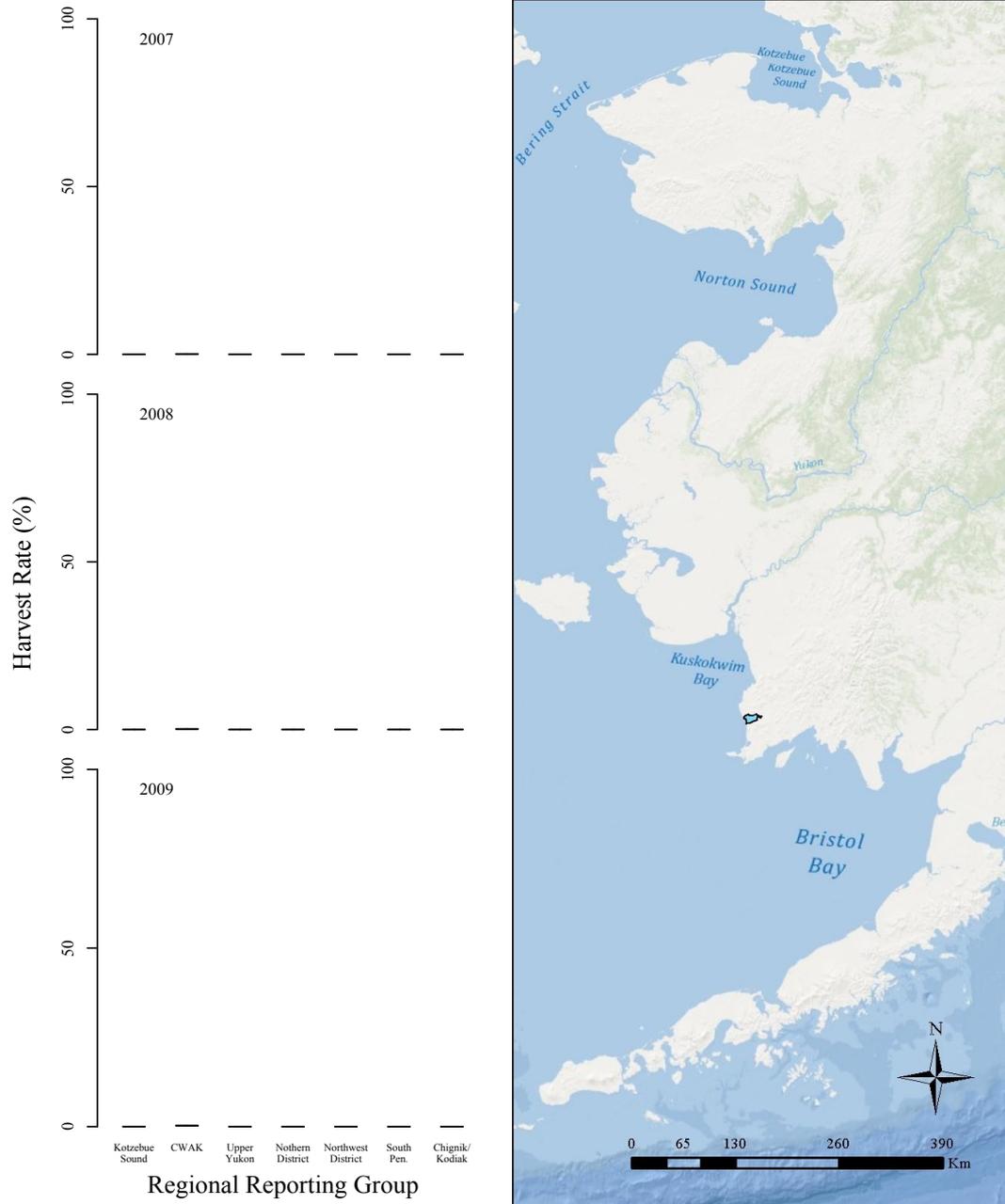


Figure 57.—

Where to find stock-specific harvest rates for a given fishery (chum salmon)

Special Publication No. 12-25

Harvest and Harvest Rates of Chum Salmon Stocks in Fisheries of the Western Alaska Salmon Stock Identification Program (WASSIP), 2007–2009

by

Andrew R. Munro,
Christopher Habicht,
Tyler H. Dann,
Douglas M. Eggers,
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Mark J. Witteveen,
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November 2012

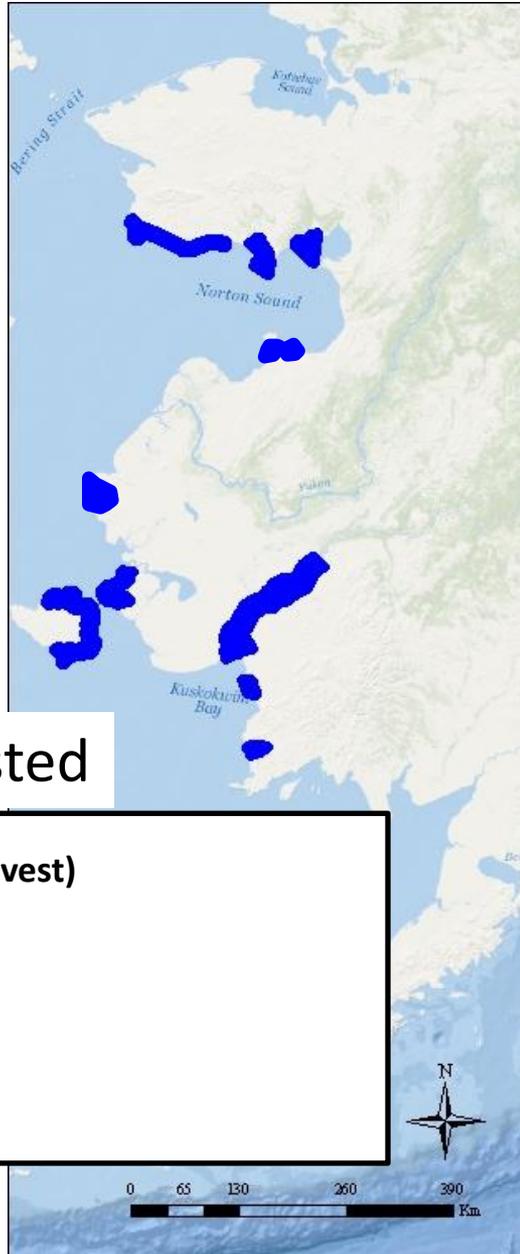
Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



- SP 12-25
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- Tables: 7 – 148
 - Tabulated data shown in figures
- Order: Starts in Chignik, ends in Kotzebue

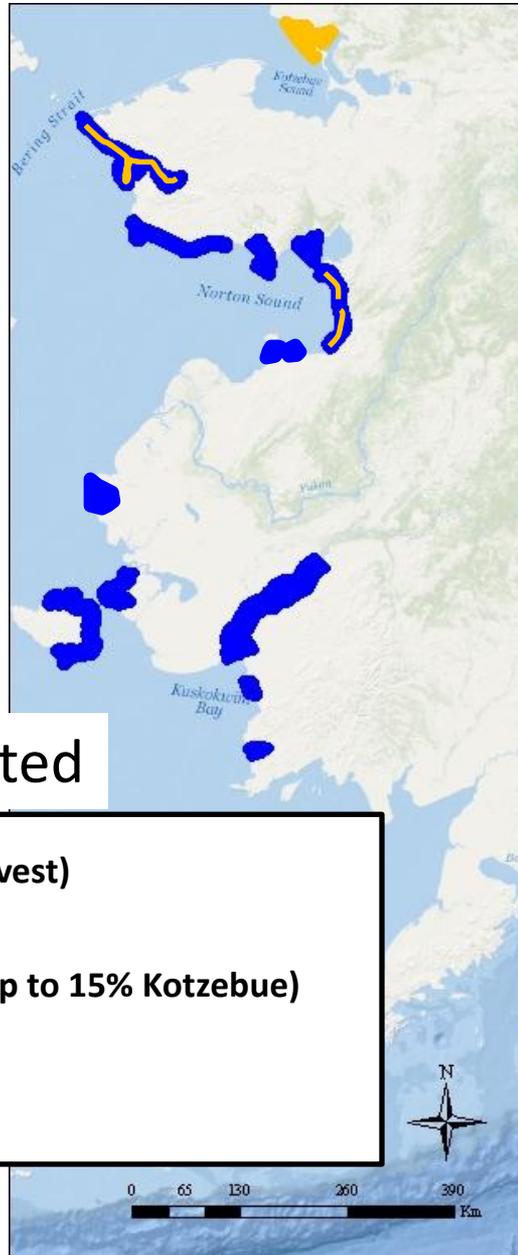
Overview of chum salmon stock-specific harvests in AYK



Stocks harvested

● CWAK (>98% of harvest)

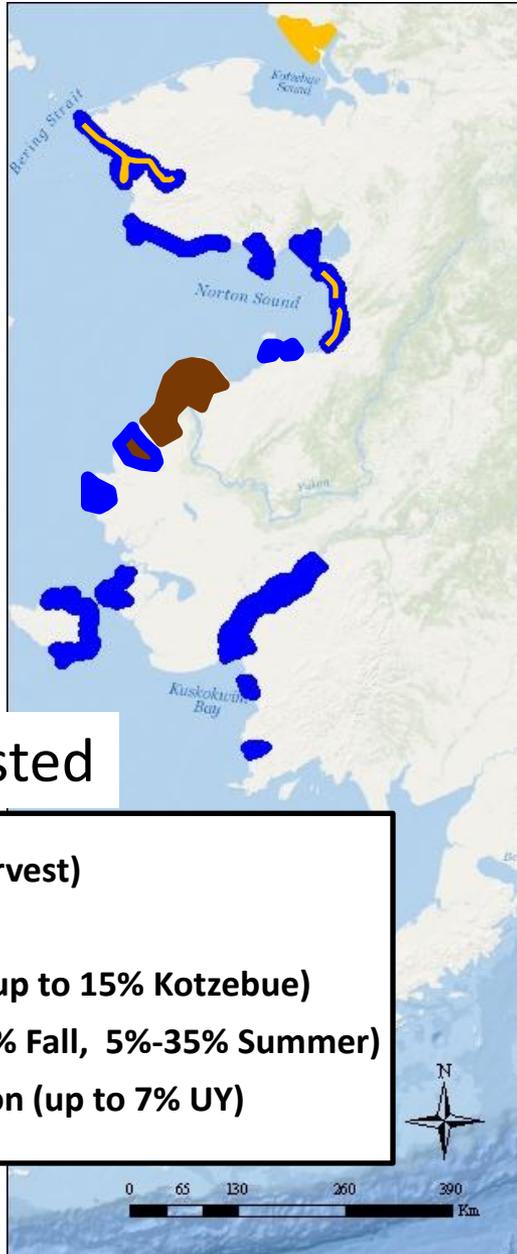
Overview of chum salmon stock-specific harvests in AYK



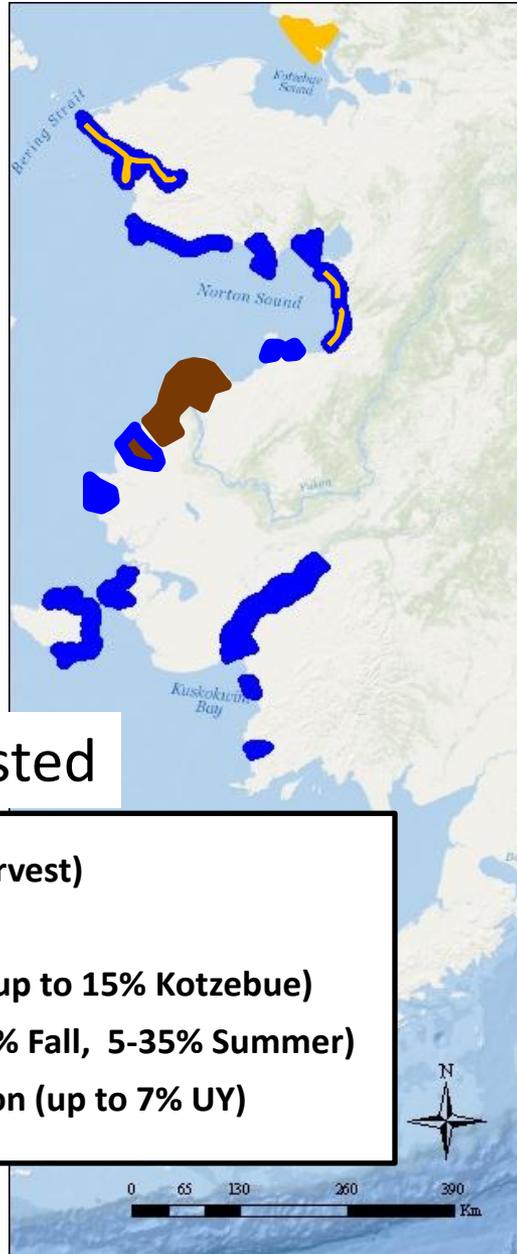
Stocks harvested

- CWAK (>98% of harvest)
- Kotzebue (>99%)
- CWAK/ Kotzebue (up to 15% Kotzebue)

Overview of chum salmon stock-specific harvests in AYK

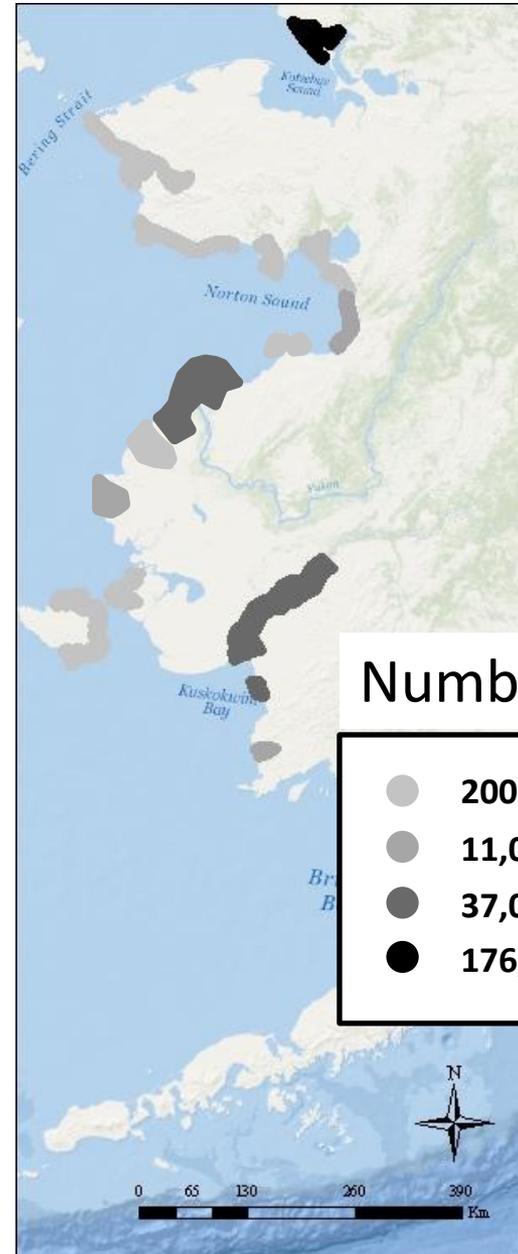


Overview of chum salmon stock-specific harvests in AYK



Stocks harvested

- CWAK (>98% of harvest)
- Kotzebue (>99%)
- CWAK/ Kotzebue (up to 15% Kotzebue)
- Upper Yukon (>50% Fall, 5-35% Summer)
- CWAK/ Upper Yukon (up to 7% UY)



Numbers harvested

- 200 – 7,000
- 11,000 – 19,000
- 37,000 – 71,000
- 176,000

In what fisheries are a given stock caught?

Coastal Western Alaska stock; harvest rates

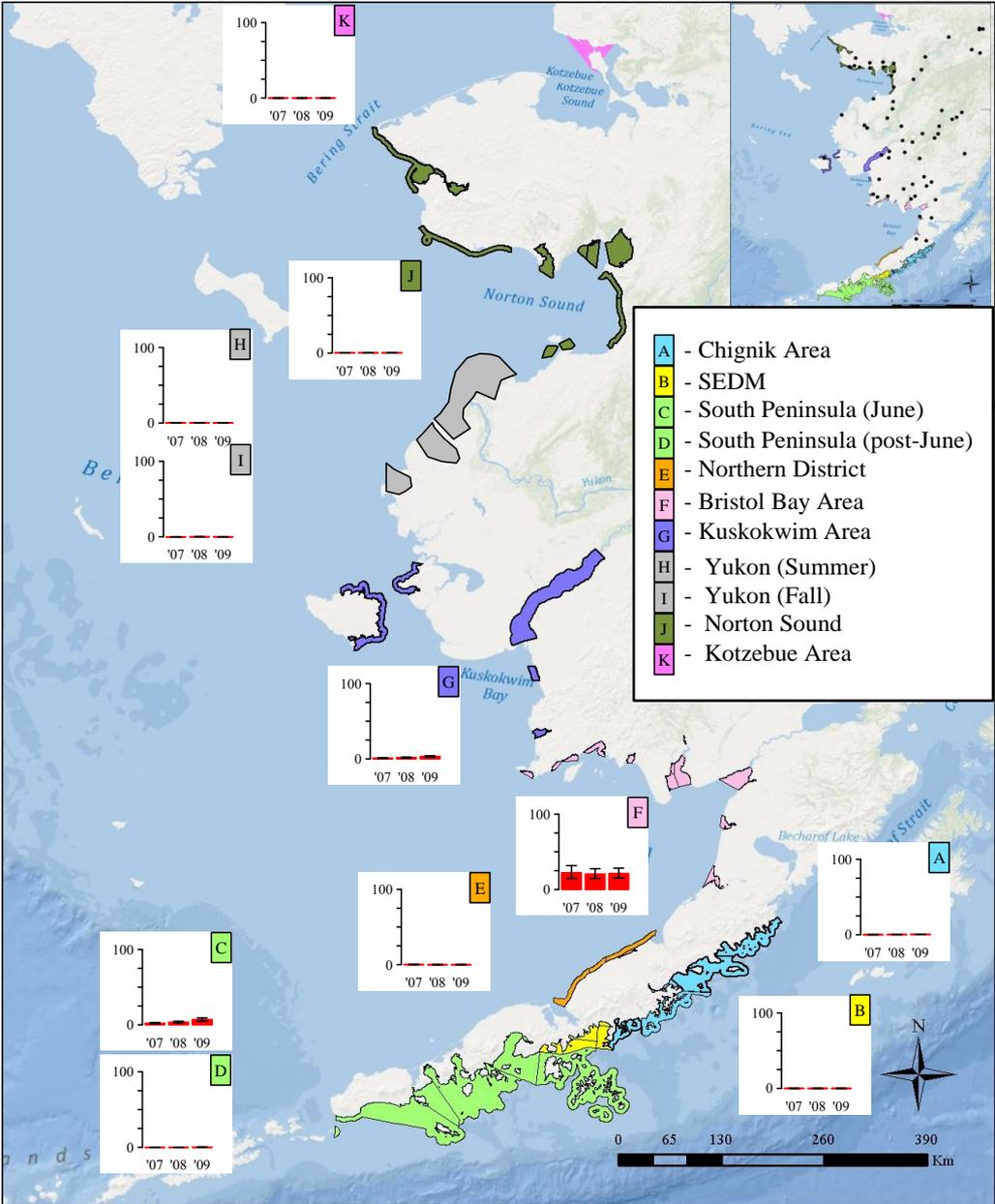


Figure 78.-

Where to find harvest rates for a specific stock across all fisheries (chum salmon)

Special Publication No. 12-25

**Harvest and Harvest Rates of Chum Salmon Stocks
in Fisheries of the Western Alaska Salmon Stock
Identification Program (WASSIP), 2007–2009**

by

Andrew R. Munro,
Christopher Habicht,
Tyler H. Dann,
Douglas M. Eggers,
William D. Templin,
Mark J. Witteveen,
Timothy T. Baker,
Kathrine G. Howard,
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Heather L. Liller,
Erica L. Chenoweth,
and
Eric C. Volk

November 2012

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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Kotzebue stock; harvest rates

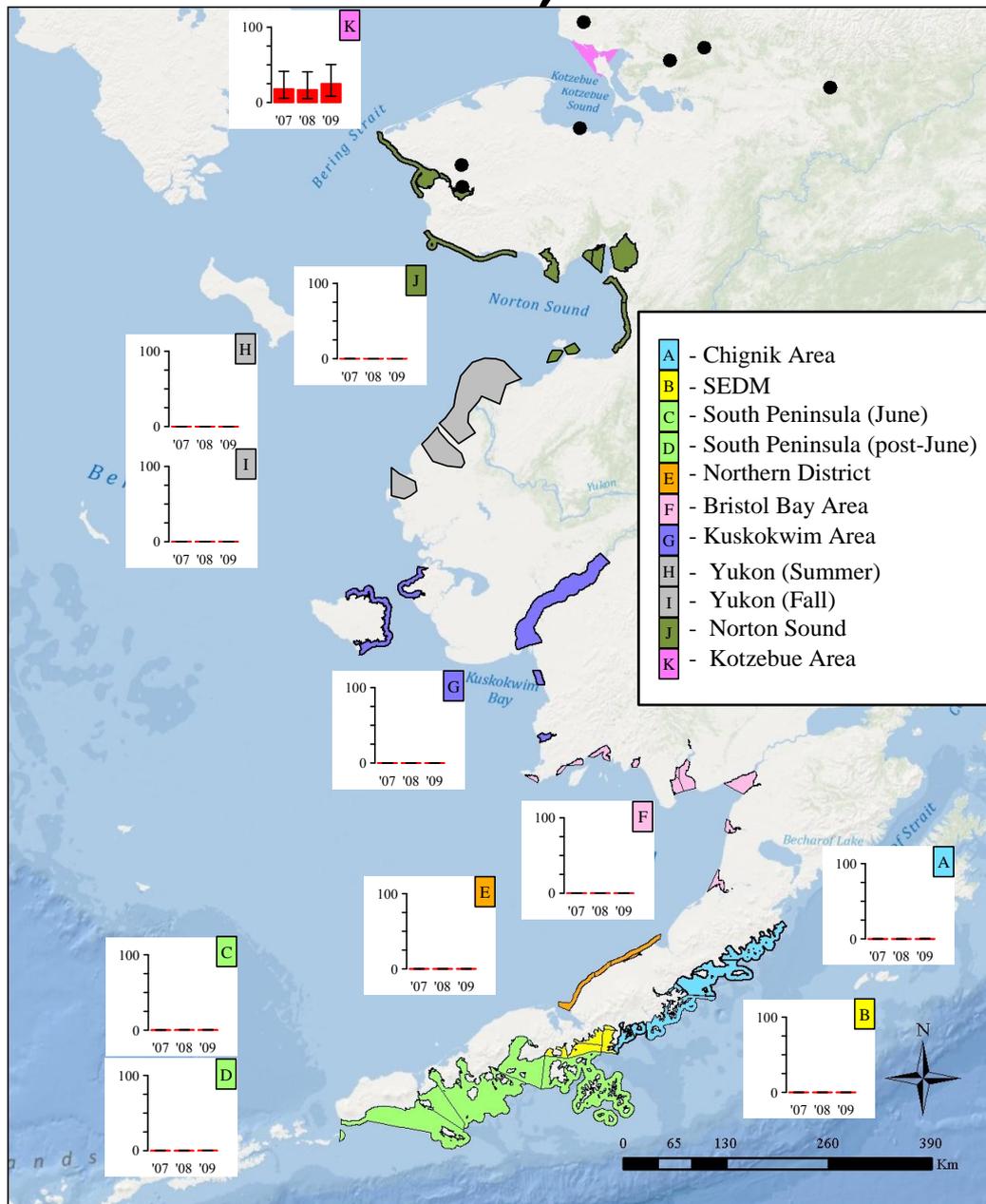


Figure 77.-

Upper Yukon River stock; harvest rates

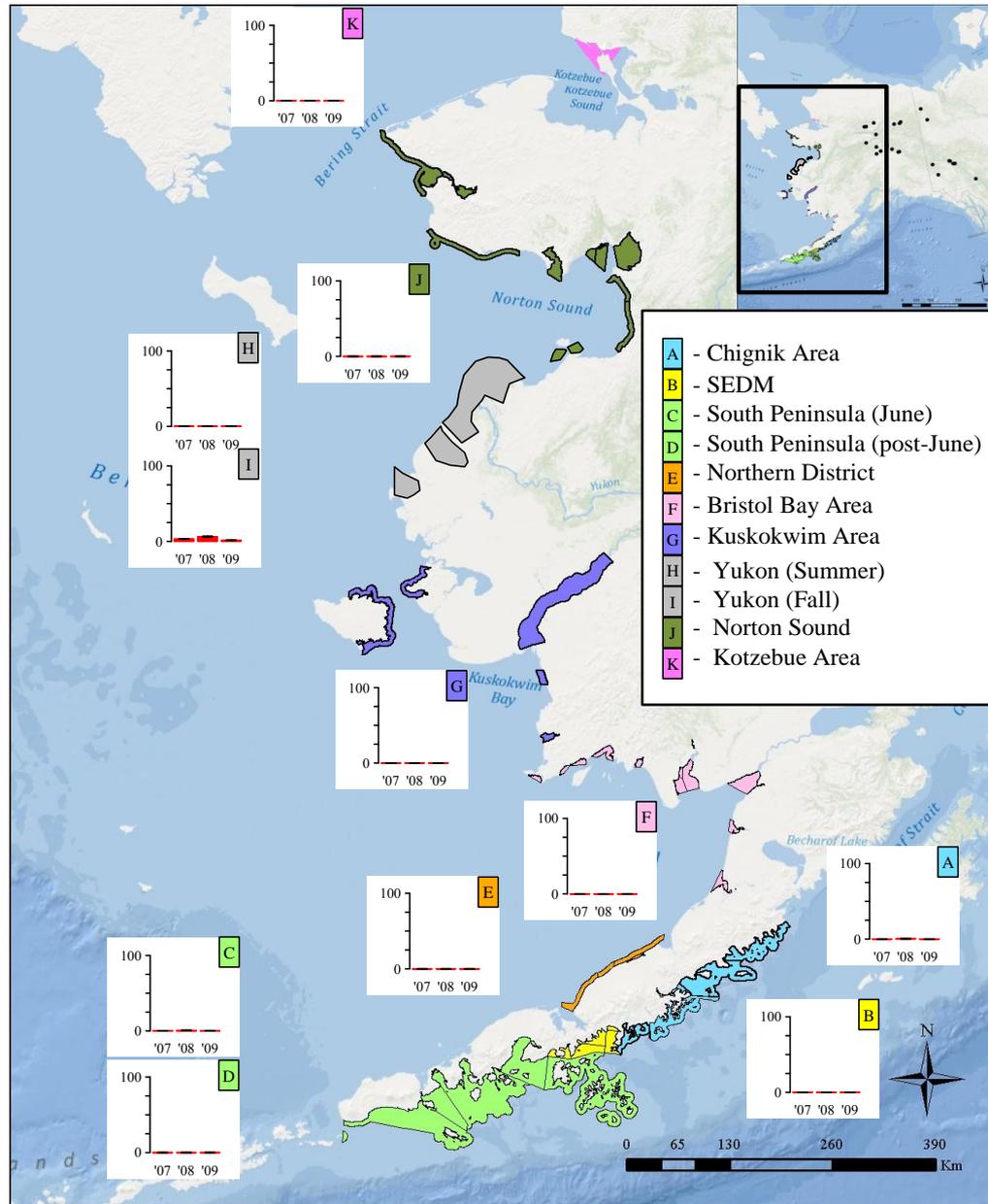
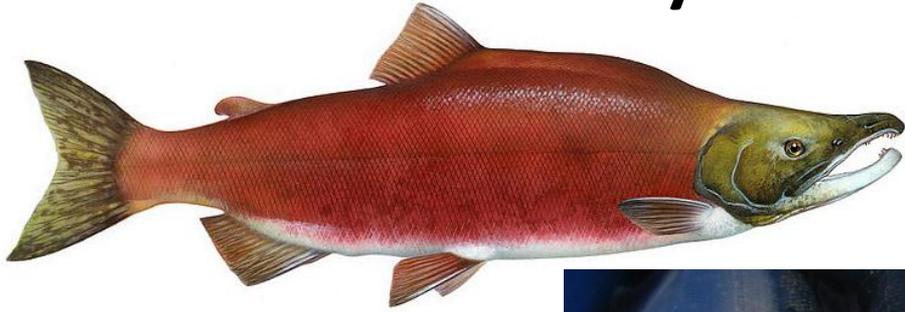


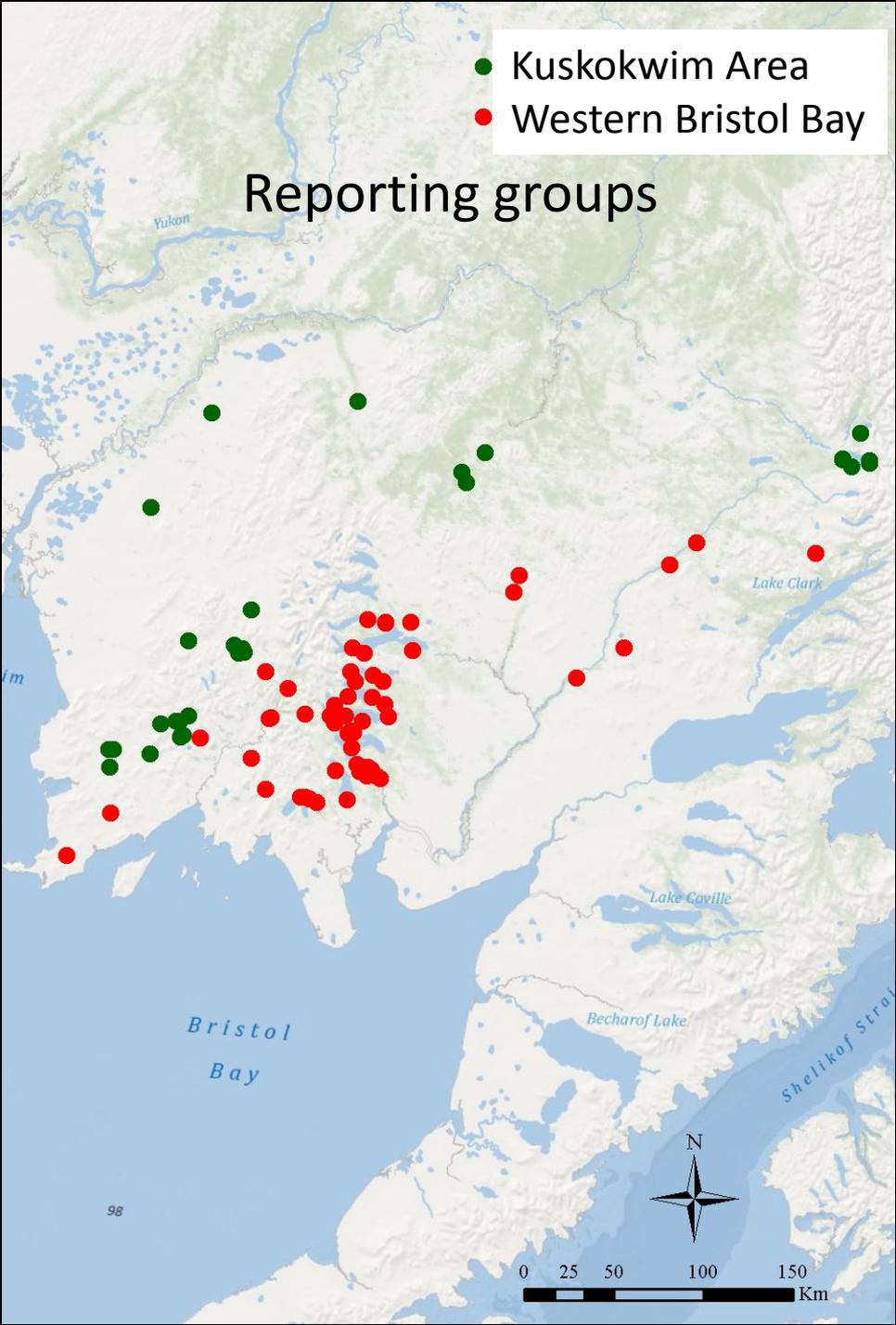
Figure 79.-

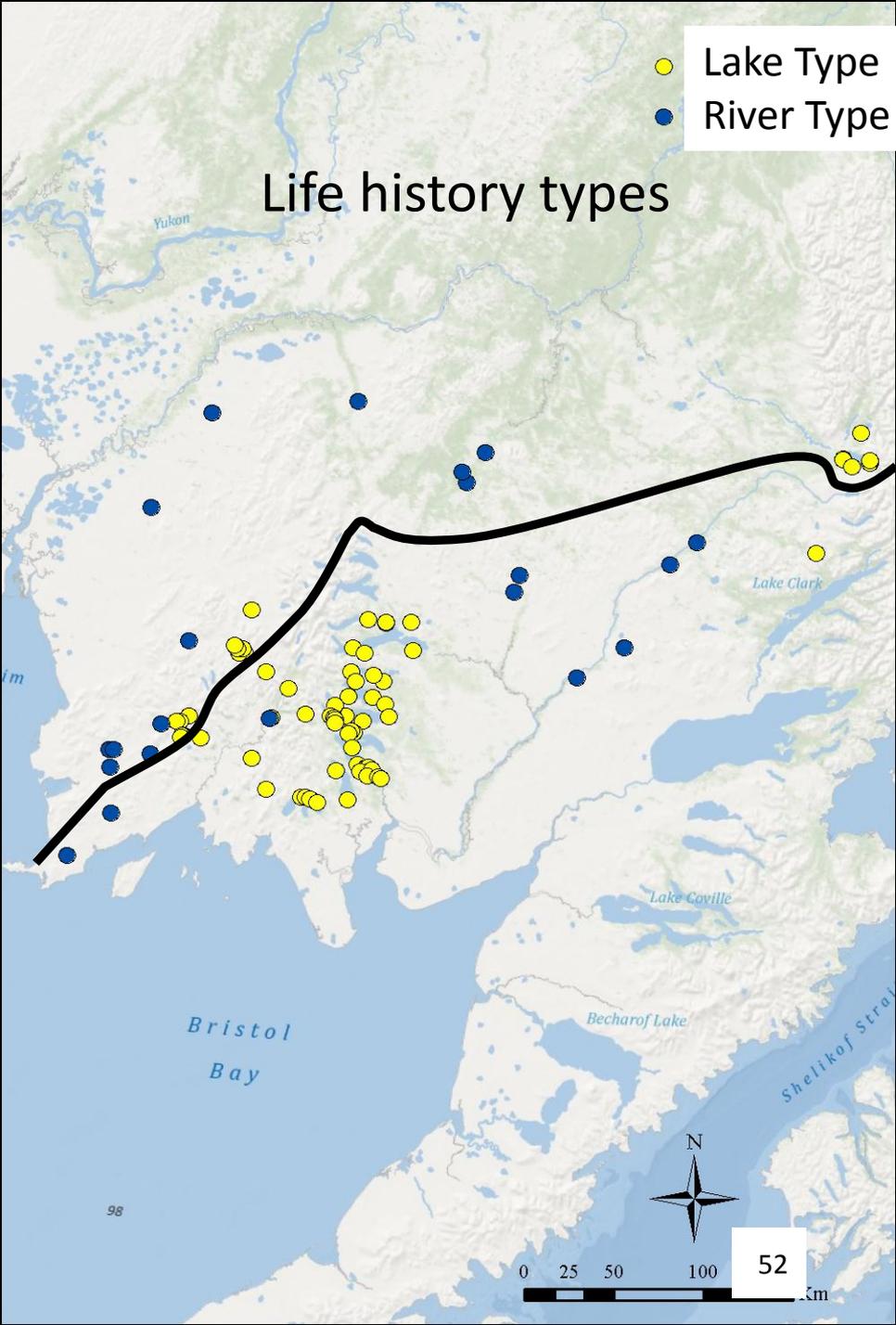
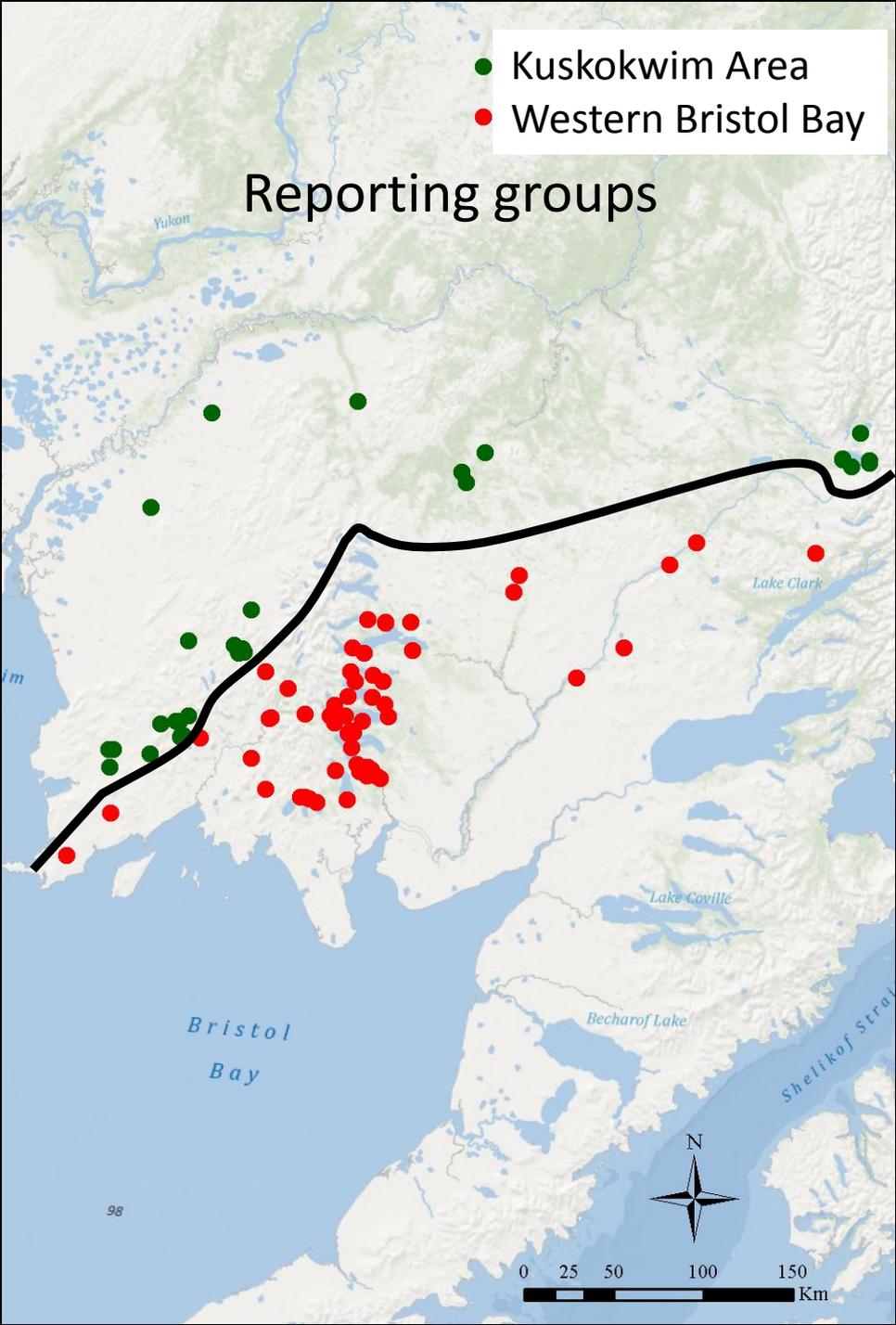
Sockeye salmon results

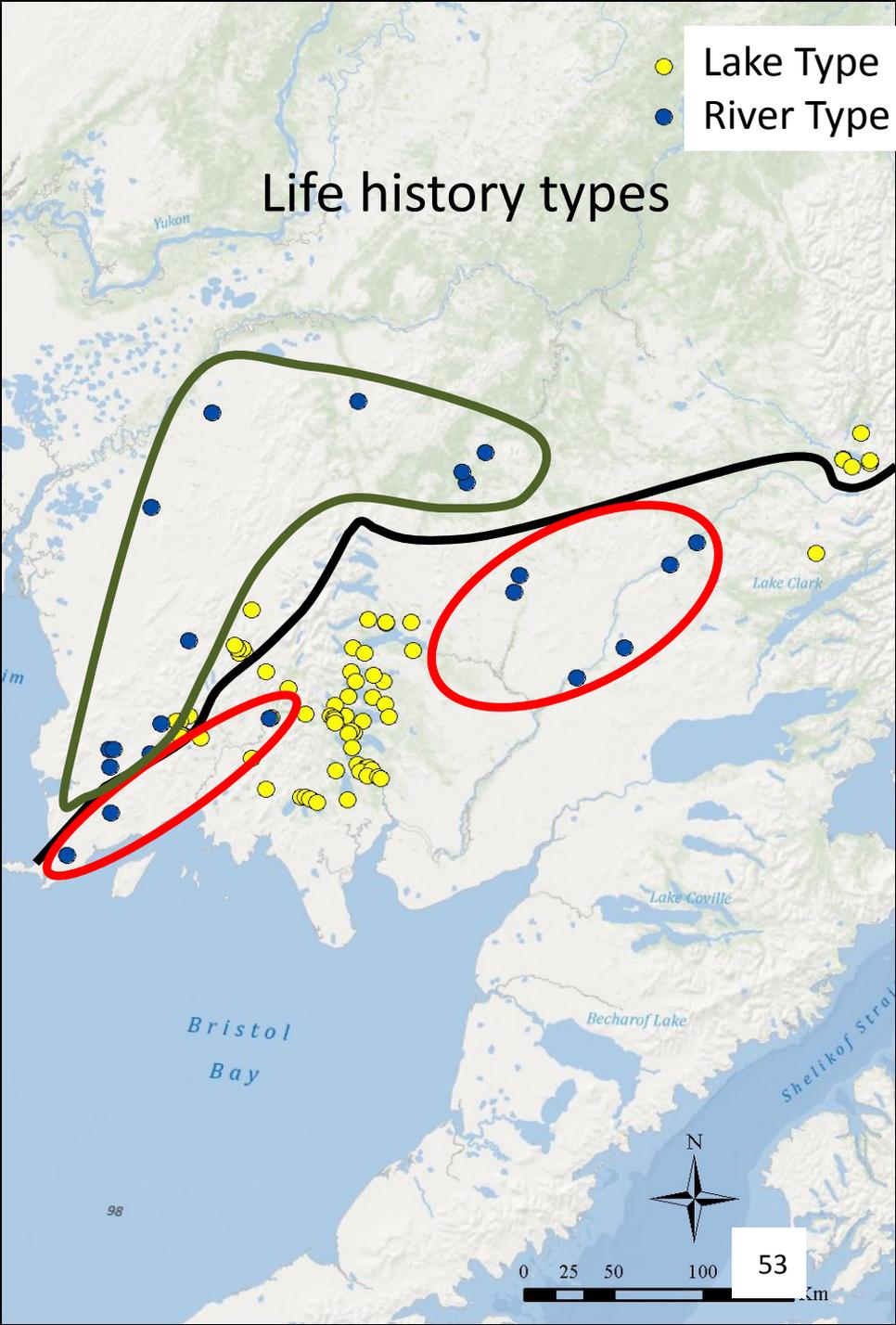
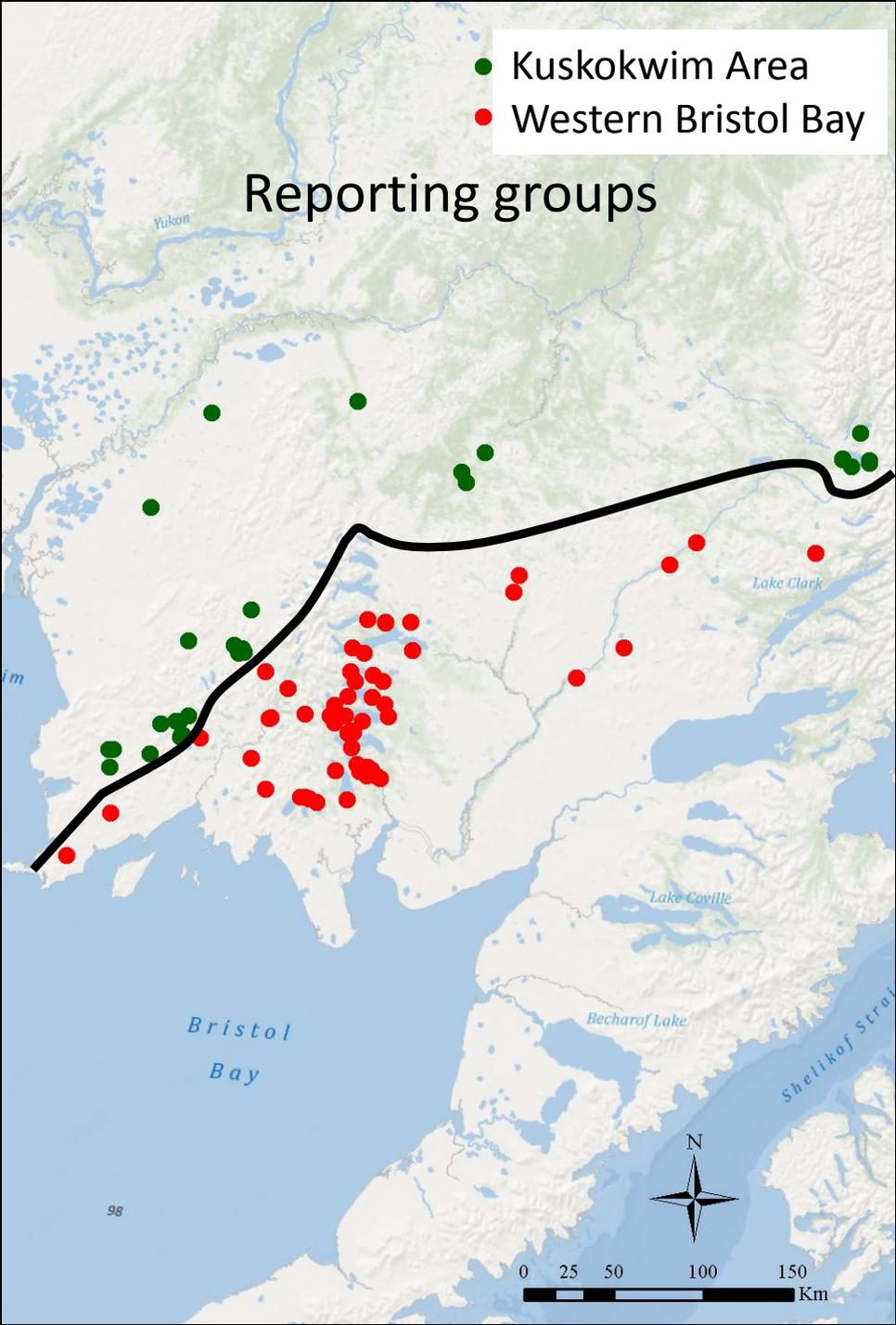


Life history types of sockeye salmon

- Lake type
 - Spawn in lakes and lake outlets and inlets
 - Rear in lakes, spend 1-2 years
 - Genetically divergent among lakes
- River type
 - Spawn in river sloughs
 - Rear in river, often migrating to sea early
 - Genetically similar, even across drainages

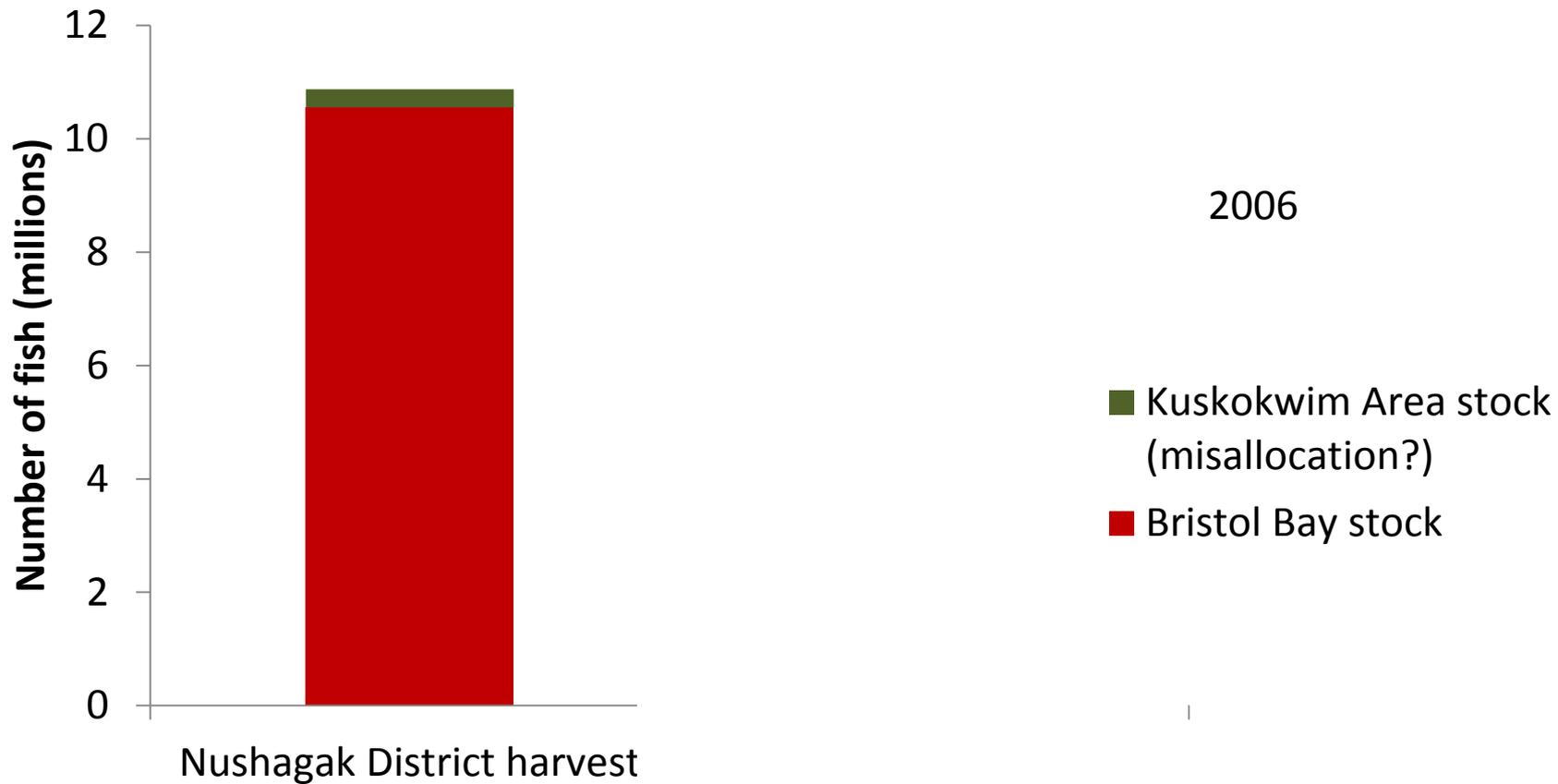






Small misallocation of large harvest =
large proportion of small run

Small misallocation of large harvest = large proportion of small run

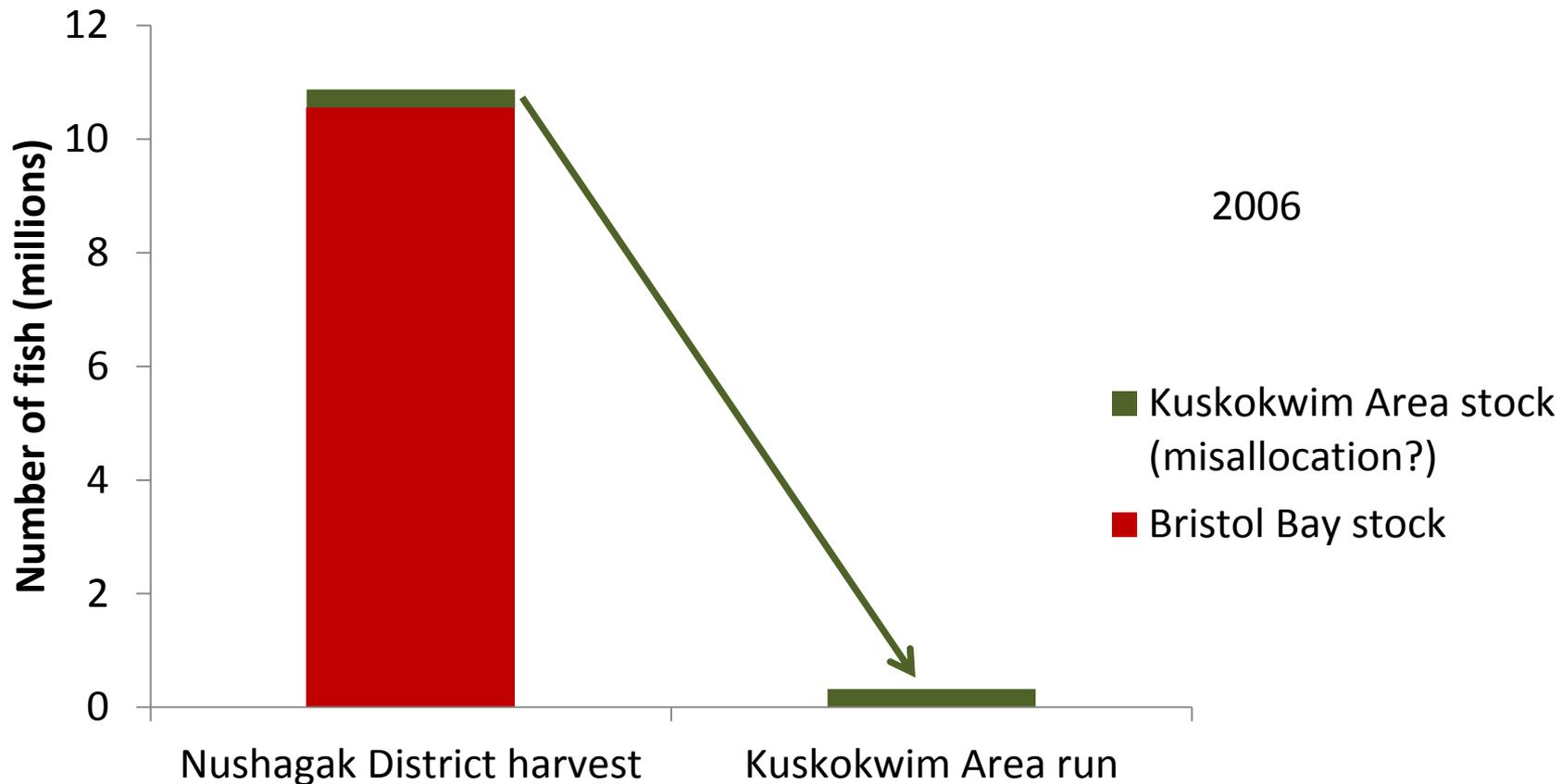


Small misallocation of large harvest = large proportion of small run



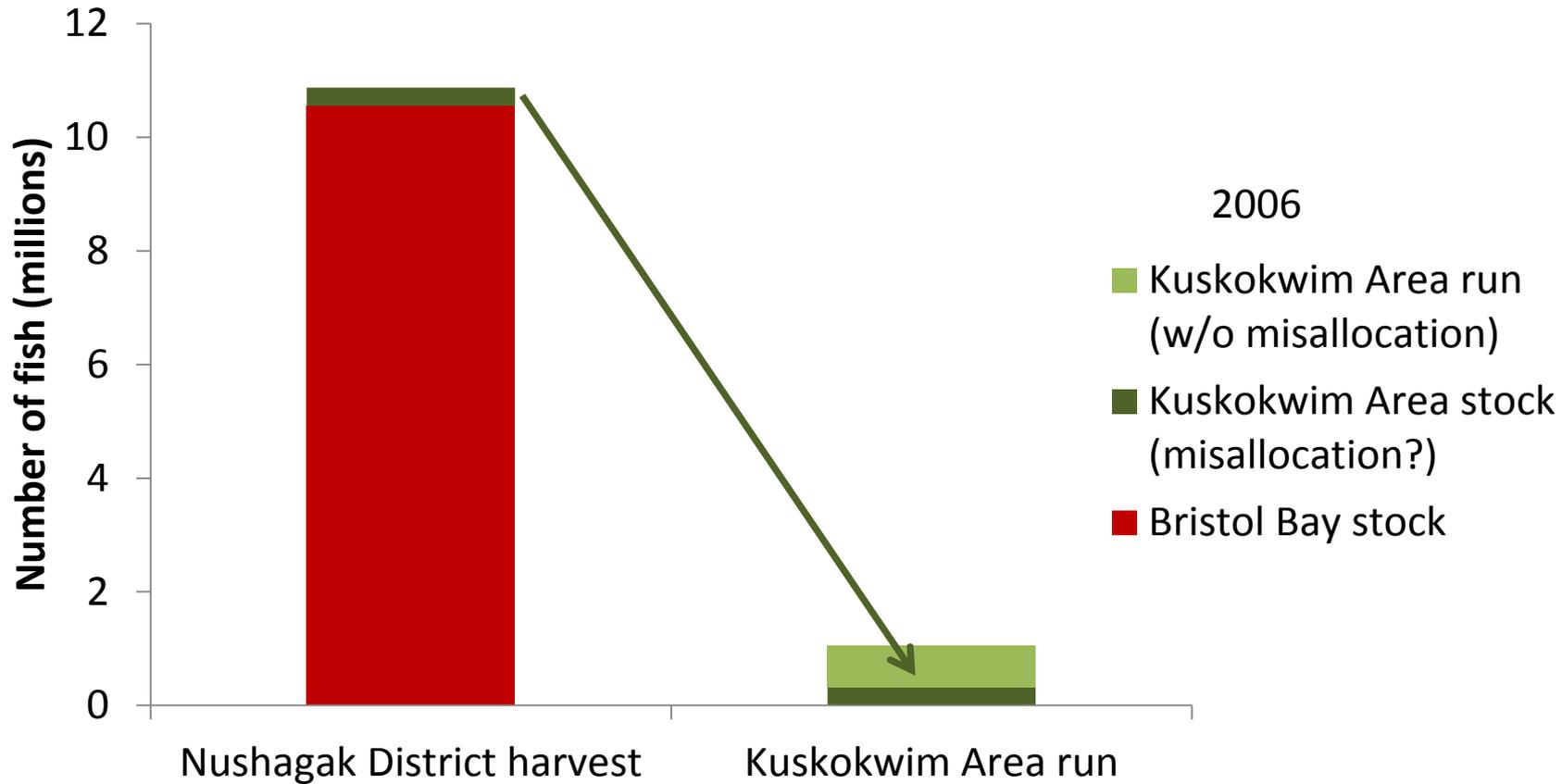
3% of harvest is allocated to Kuskokwim

Small misallocation of large harvest = large proportion of small run



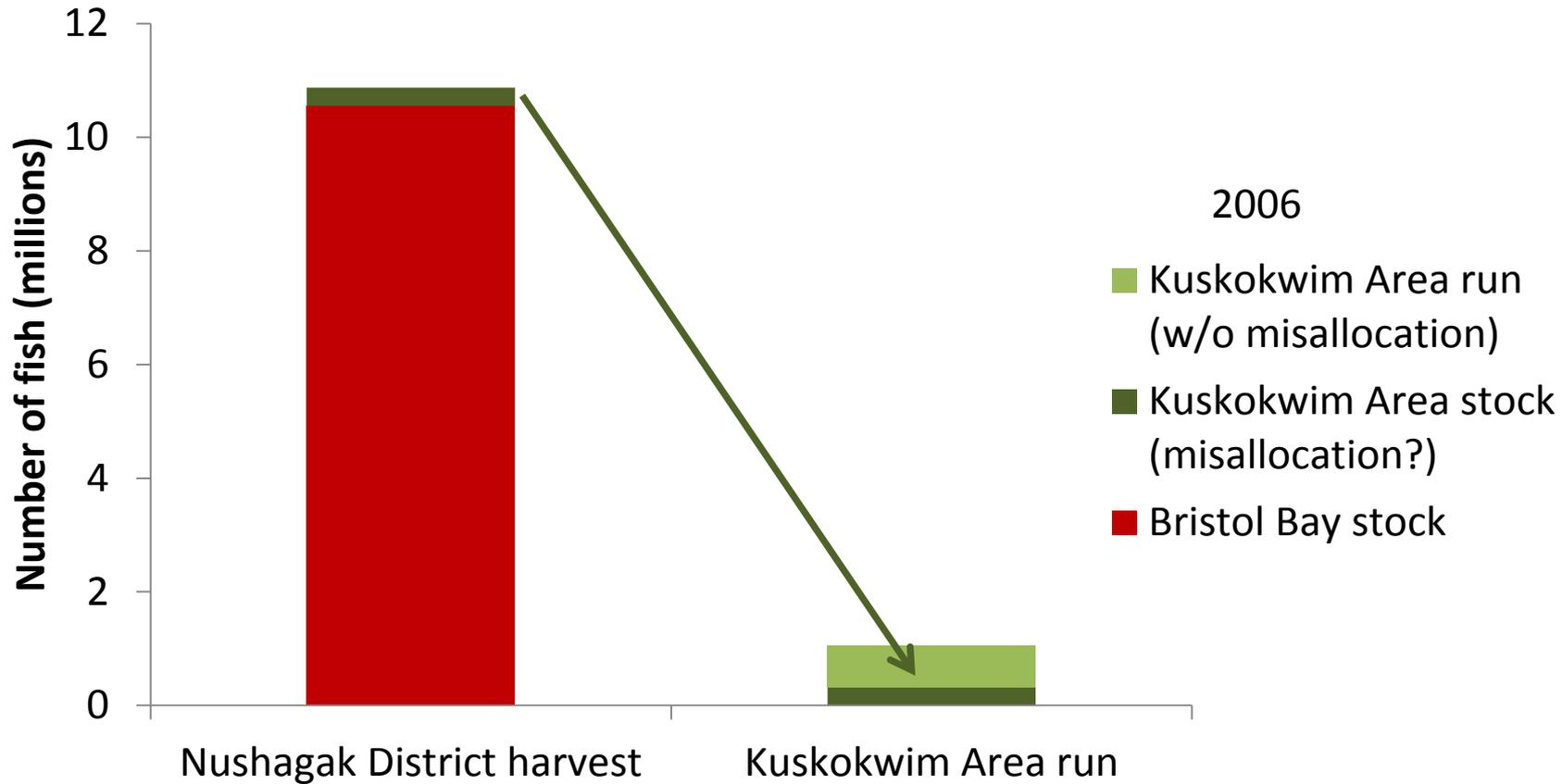
3% of harvest is allocated to Kuskokwim

Small misallocation of large harvest = large proportion of small run



3% of harvest is allocated to Kuskokwim

Small misallocation of large harvest = large proportion of small run



3% of harvest \longrightarrow 31% of run

Baseline reporting groups (stocks)

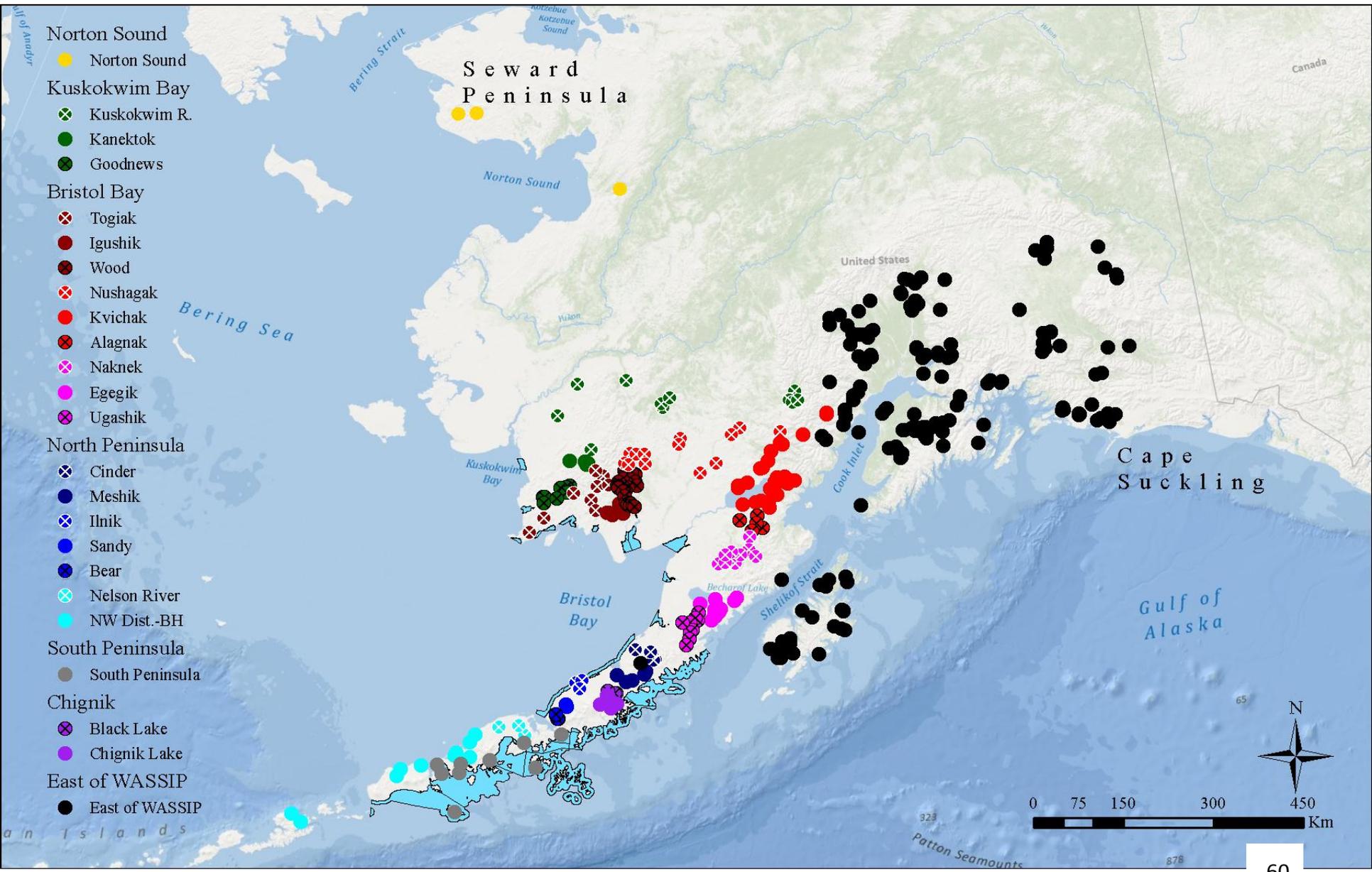


Figure 1.-

Where to find stock definitions for sockeye salmon

Special Publication No. 12-12

Sockeye Salmon Baseline for the Western Alaska Salmon Stock Identification Project

by

Tyler H. Dann

Christopher Habicht

James R. Jasper

Elisabeth K. C. Fox

Heather A. Hoyt

Heather L. Liller

Eric S. Lardizabal

Paul A. Kuriseak

Zachary D. Grauvogel

and

William D. Templin

July 2012

Alaska Department of Fish and Game

Division of Sport Fish and Commercial Fisheries



- SP 12-12
- Figures: 1 – 11
- Table: 2
- Order: Starts in Norton Sound, ends in Copper River

What stocks are caught in a given fishery?

Goodnews commercial; stock compositions

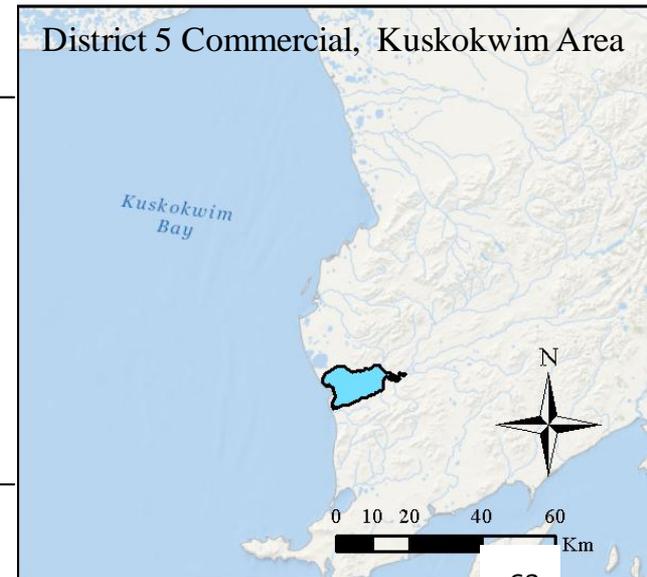
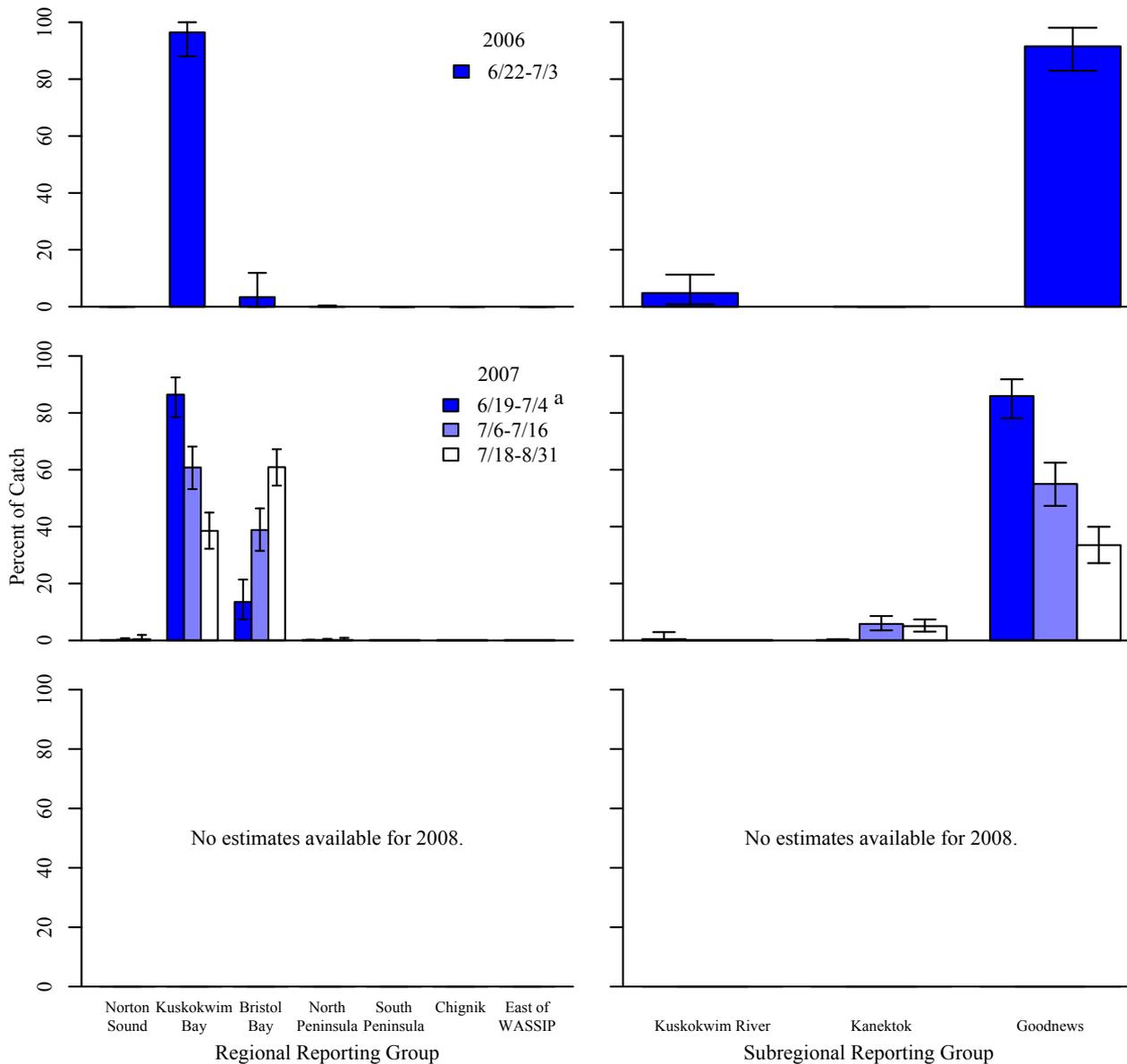


Figure 25.-

Where to find stock compositions for a given fishery (sockeye salmon)

Special Publication No. 12-22

Stock Composition of Sockeye Salmon Harvests in Fisheries of the Western Alaska Salmon Stock Identification Program (WASSIP), 2006-2008

by

Tyler H. Dann,
Christopher Habicht,
Serena D. Rogers Olive,
Heather L. Liller,
Elisabeth K.C. Fox,
James R. Jasper,
Andrew R. Munro,
Mark J. Witteveen,
Timothy T. Baker,
Kathrine G. Howard,
Eric C. Volk,
and
William D. Templin

November 2012

Alaska Department of Fish and Game Divisions of Sport Fish and Commercial Fisheries



- SP 12-22
- Figures: 2 – 26
- Tables: 3 – 92
 - Tabulated data shown in figures
- Appendices: B1 – H5
 - All fine-scale stock compositions
- Order: Starts in Chignik, ends in Kuskokwim

Goodnews commercial; harvest numbers

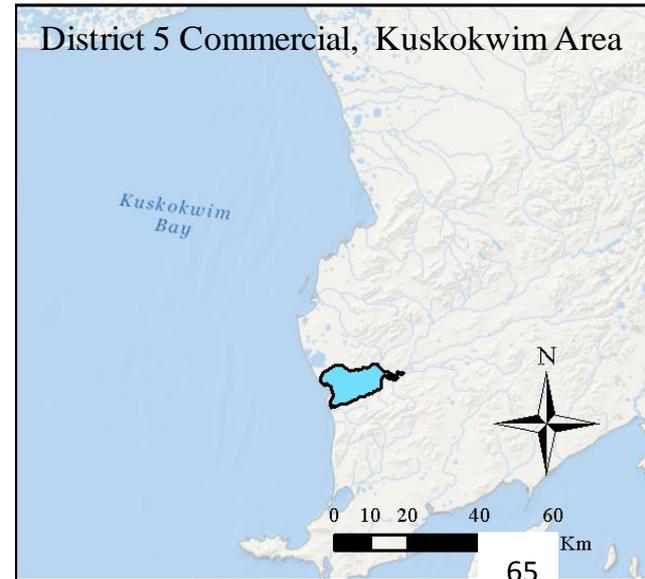
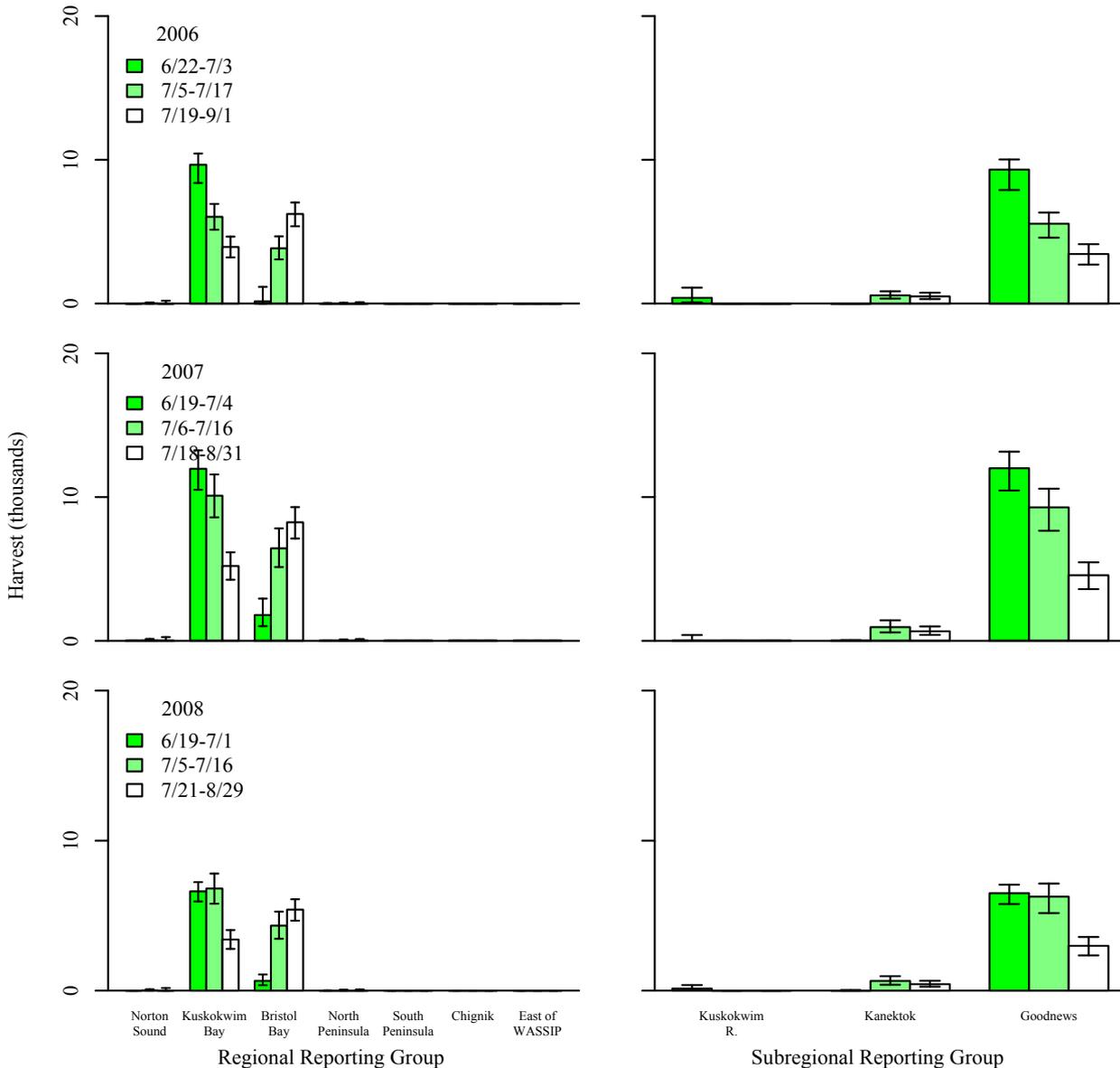


Figure 26.-

Where to find stock-specific harvest numbers for a given fishery (sockeye salmon)

Special Publication No. 12-24

**Harvest and Harvest Rates of Sockeye Salmon
Stocks in Fisheries of the Western Alaska Salmon
Stock Identification Program (WASSIP), 2006-2008**

by

Christopher Habicht,
Andrew R. Munro,
Tyler H. Dann,
Douglas M. Eggers,
William D. Templin,
Mark J. Witteveen,
Timothy T. Baker,
Kathrine G. Howard,
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Erica L. Chenoweth,
and
Eric C. Volk

November 2012

Alaska Department of Fish and Game

Division of Sport Fish and Commercial Fisheries



- SP 12-24
- Figures: 3 – 27
- Appendices: C1 - C244
 - All fine-scale harvest numbers
- Order: Starts in Chignik, ends in Kuskokwim

Goodnews commercial; harvest rates

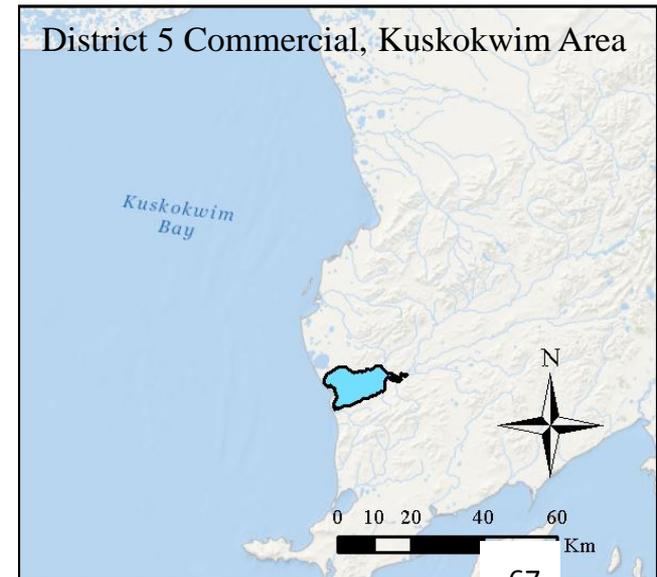
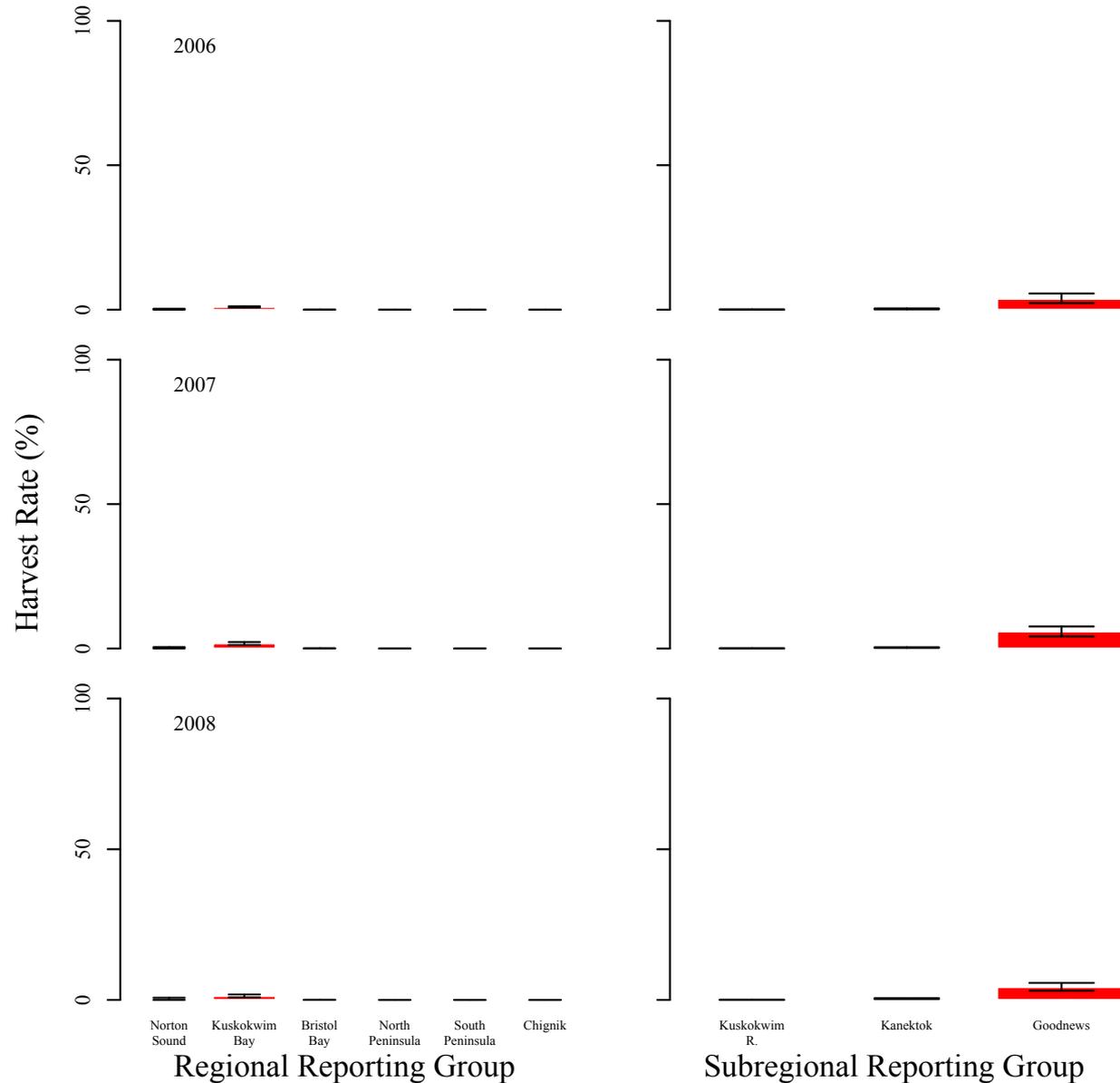


Figure 51.-

Where to find stock-specific harvest rates for a given fishery (sockeye salmon)

Special Publication No. 12-24

**Harvest and Harvest Rates of Sockeye Salmon
Stocks in Fisheries of the Western Alaska Salmon
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Eric C. Volk

November 2012

Alaska Department of Fish and Game

Division of Sport Fish and Commercial Fisheries



- SP 12-24
- Figures: 28 – 52
- Tables: 6 – 101
 - Tabulated data shown in figures
- Appendices: D1 – D75
 - All fine-scale harvest rates
- Order: Starts in Chignik, ends in Kuskokwim

Kanektok commercial; stock compositions

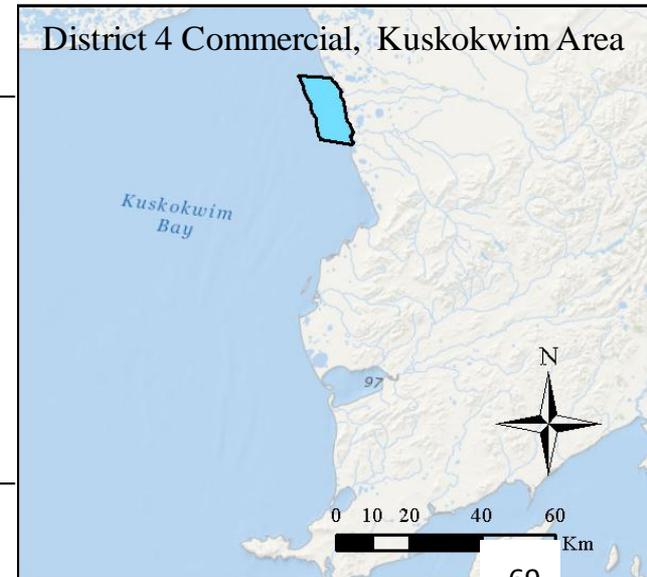
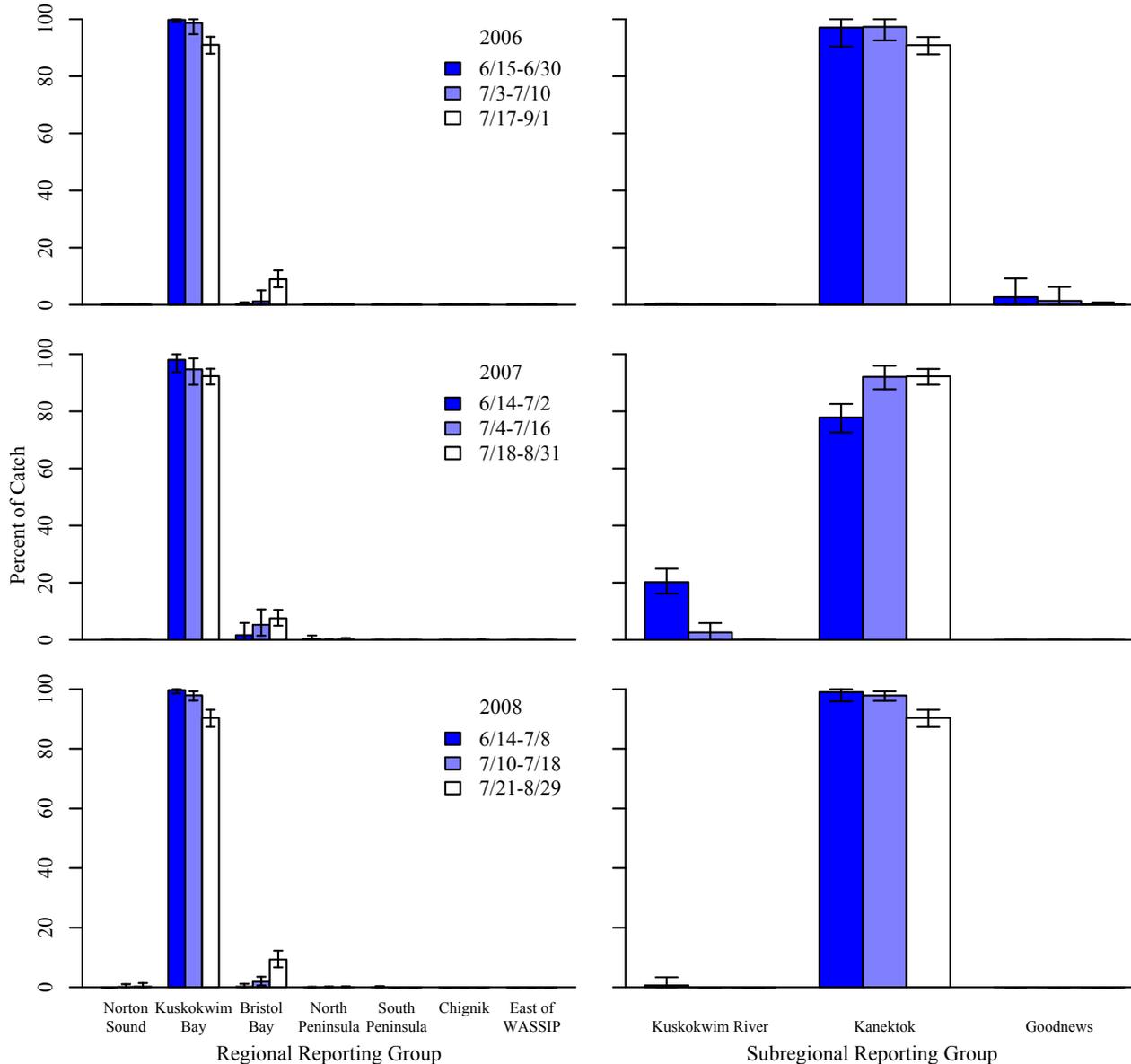


Figure 26.-

Kanektok commercial; harvest numbers

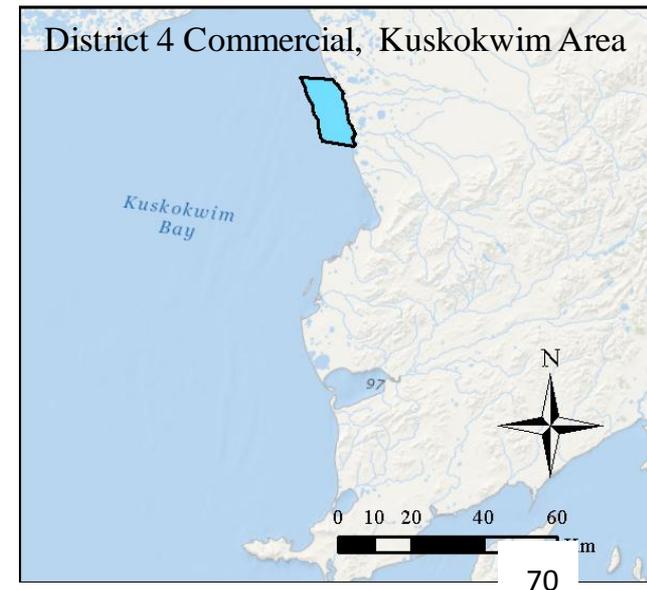
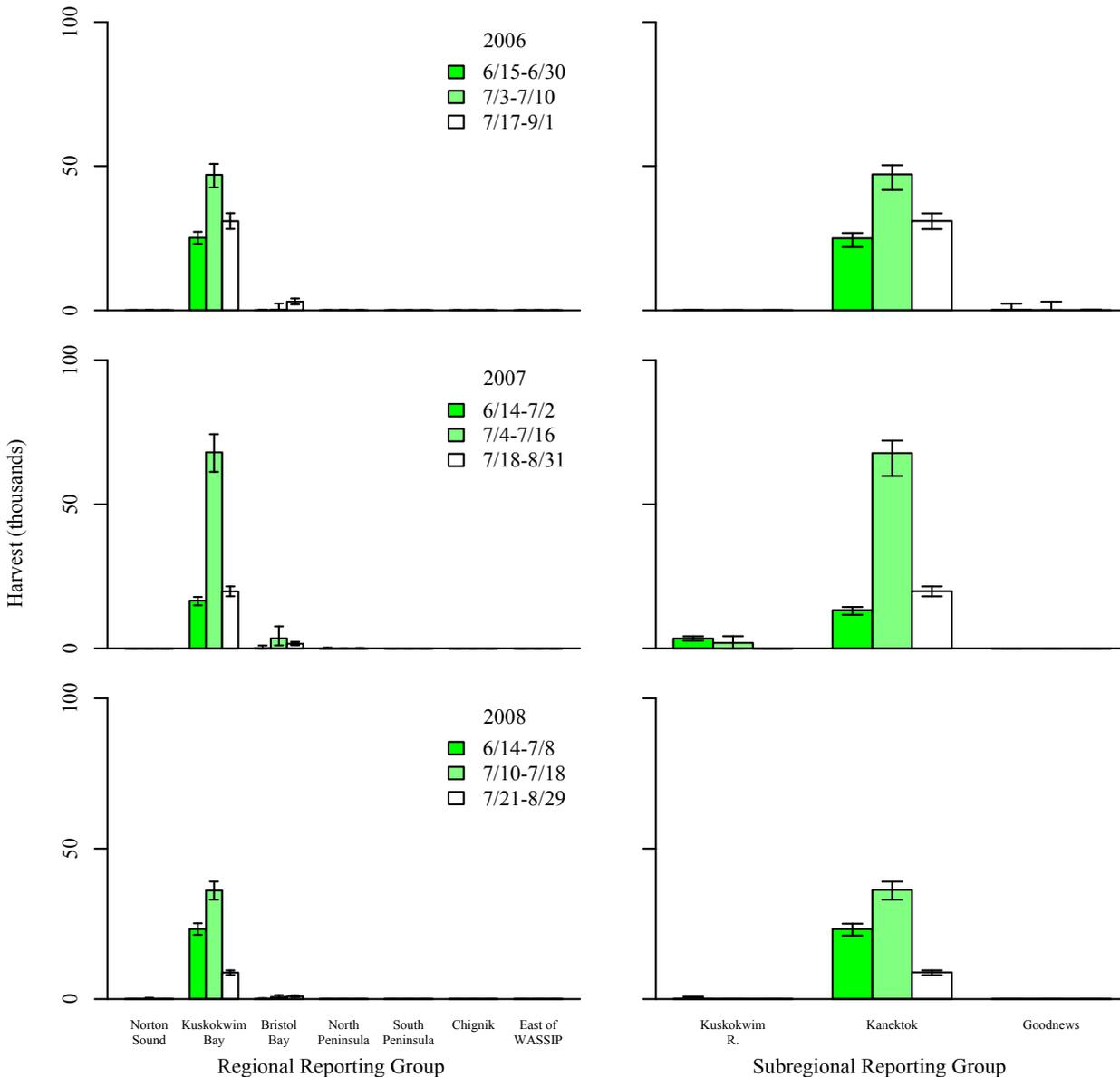


Figure 27.-

Kanektok commercial; harvest rates

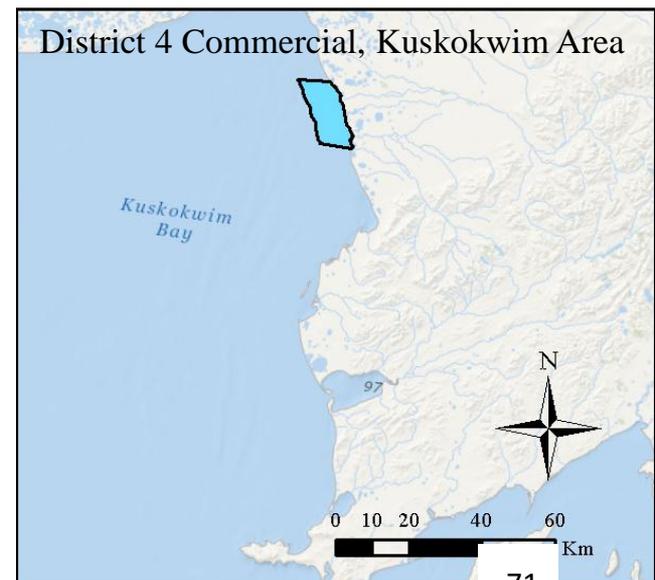
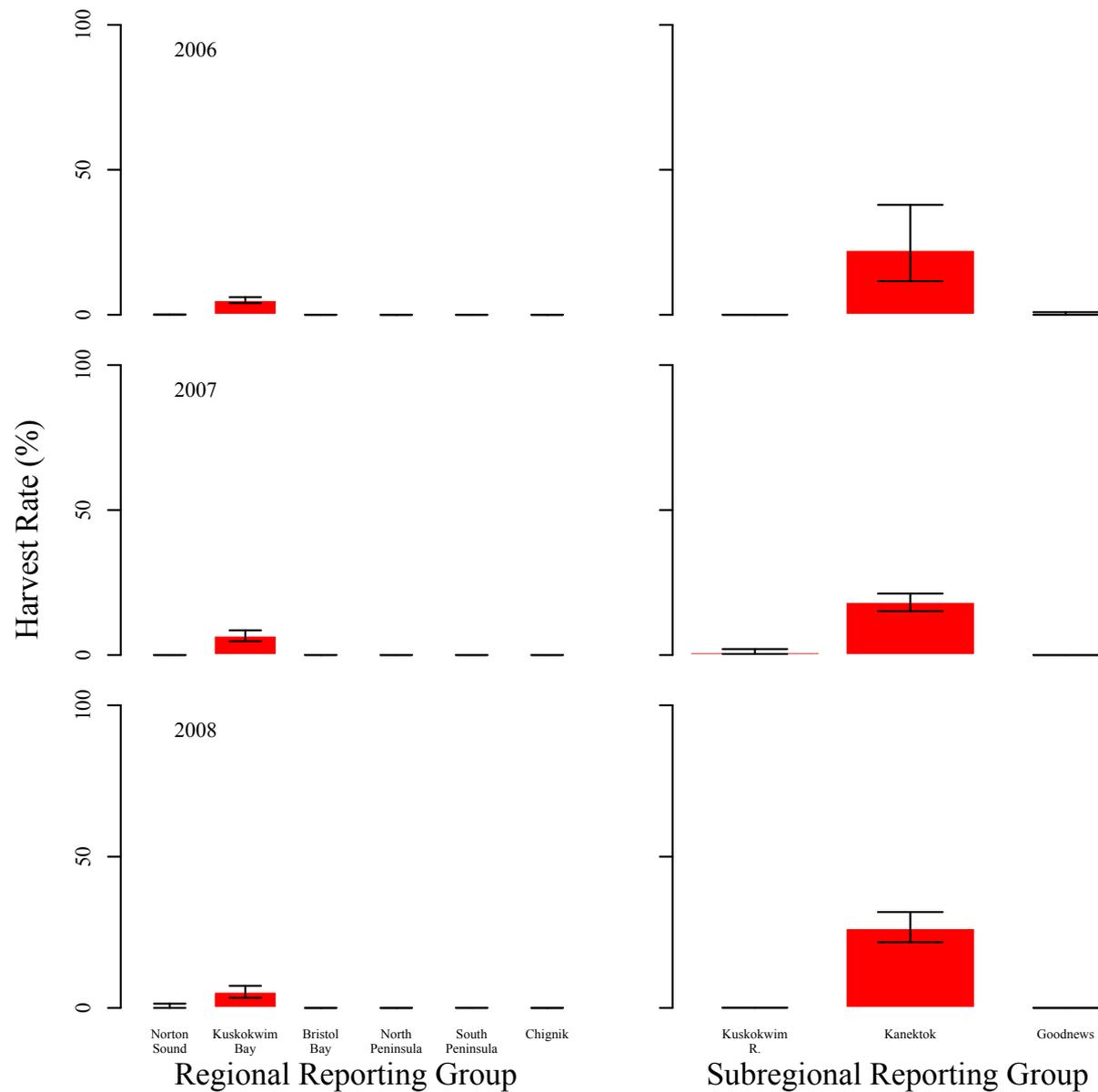


Figure 52.-

In what fisheries are a given stock caught?

Norton Sound stock; harvest rate

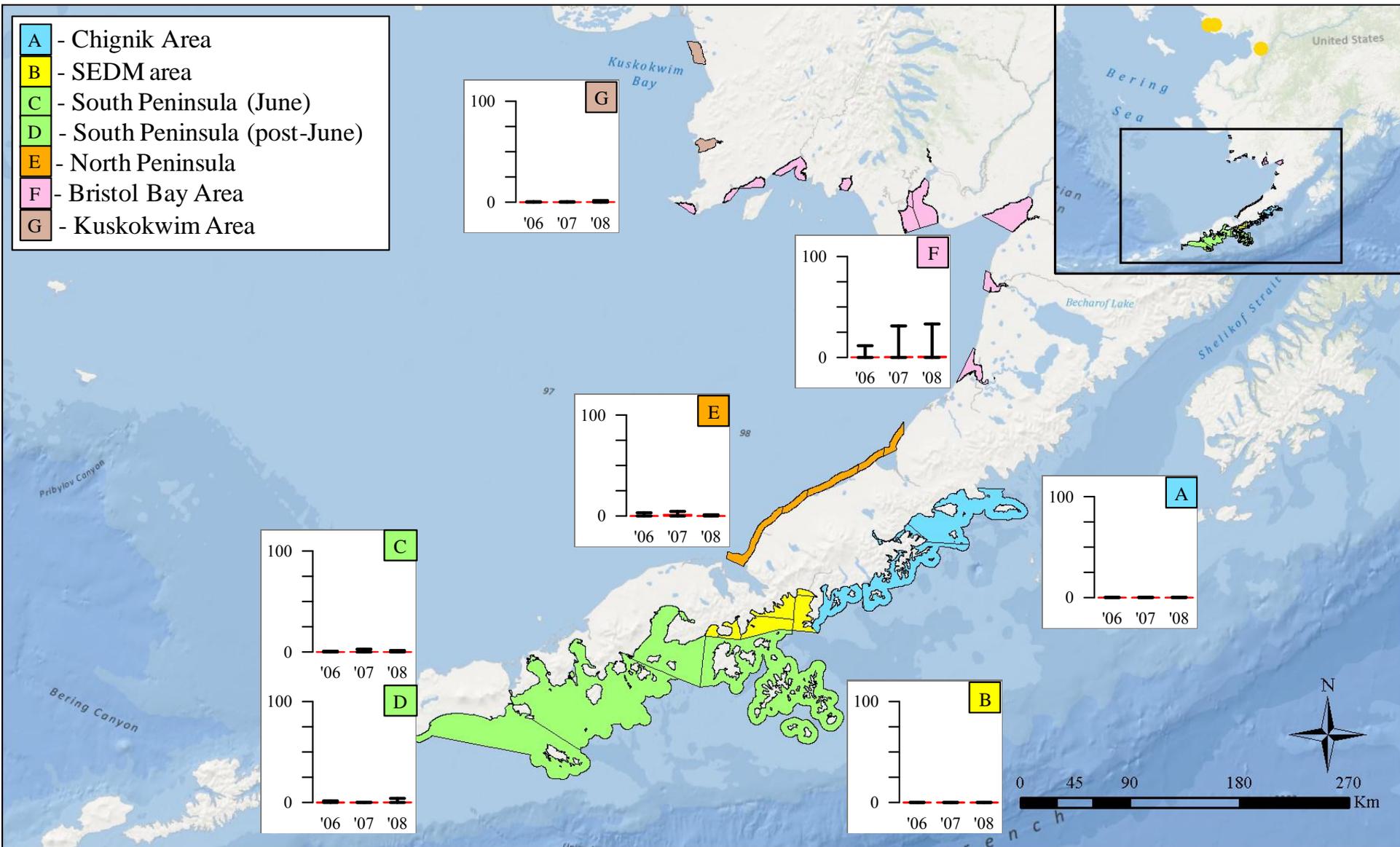


Figure 53.-

Where to find harvest rates for a specific stock across all fisheries (sockeye salmon)

Special Publication No. 12-24

**Harvest and Harvest Rates of Sockeye Salmon
Stocks in Fisheries of the Western Alaska Salmon
Stock Identification Program (WASSIP), 2006-2008**

by

Christopher Habicht,
Andrew R. Munro,
Tyler H. Dann,
Douglas M. Eggers,
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Eric C. Volk

November 2012

Alaska Department of Fish and Game

Division of Sport Fish and Commercial Fisheries



- SP 12-24
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- Tables: 105 – 176
 - Tabulated data shown in figures
- Appendices: F1 – F72
 - At fine-scale fishery level
- Order: Starts in Norton Sound, ends in Chignik

Kuskokwim River stock; harvest rate

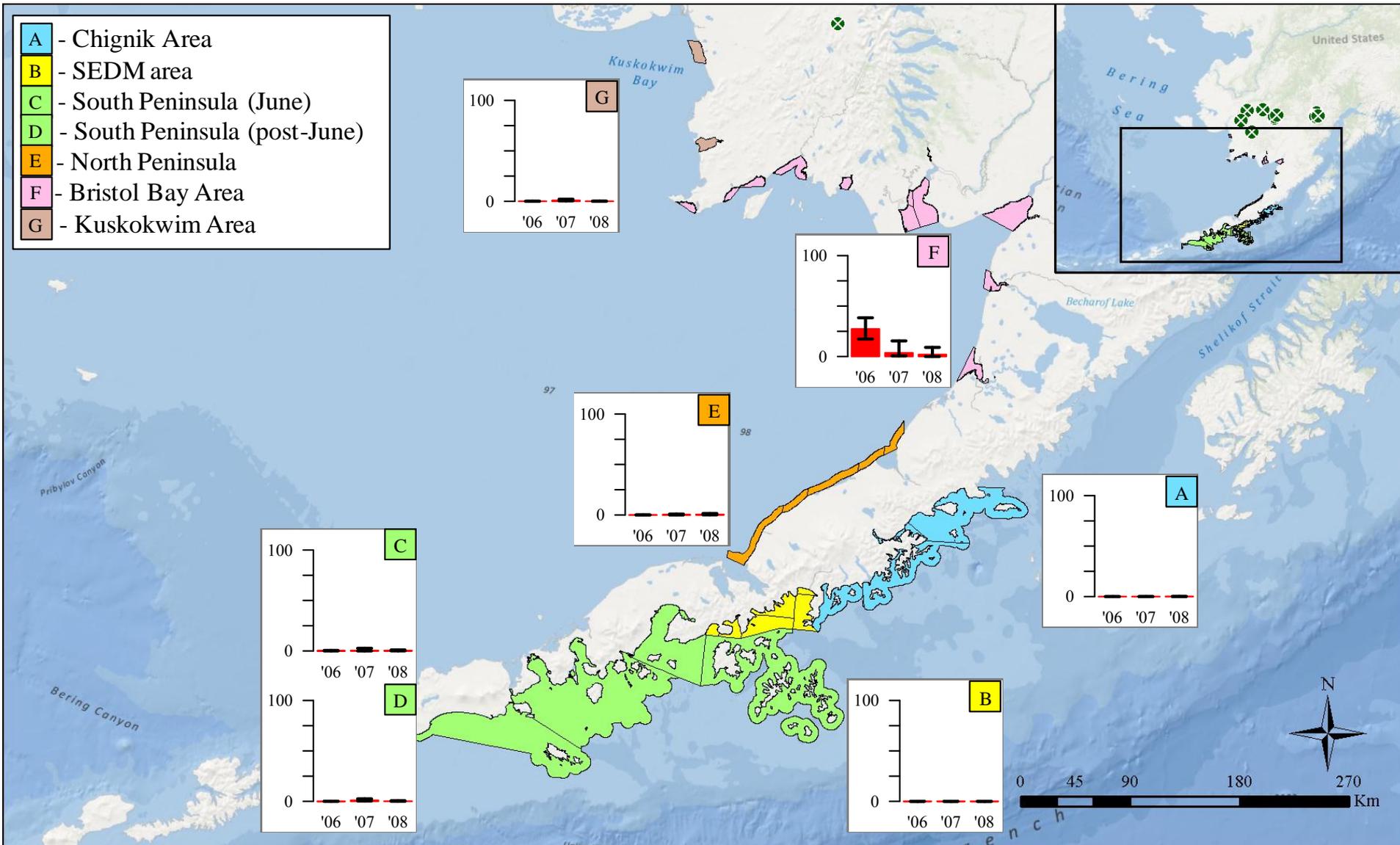


Figure 54.-

Kanektok River stock; harvest rate

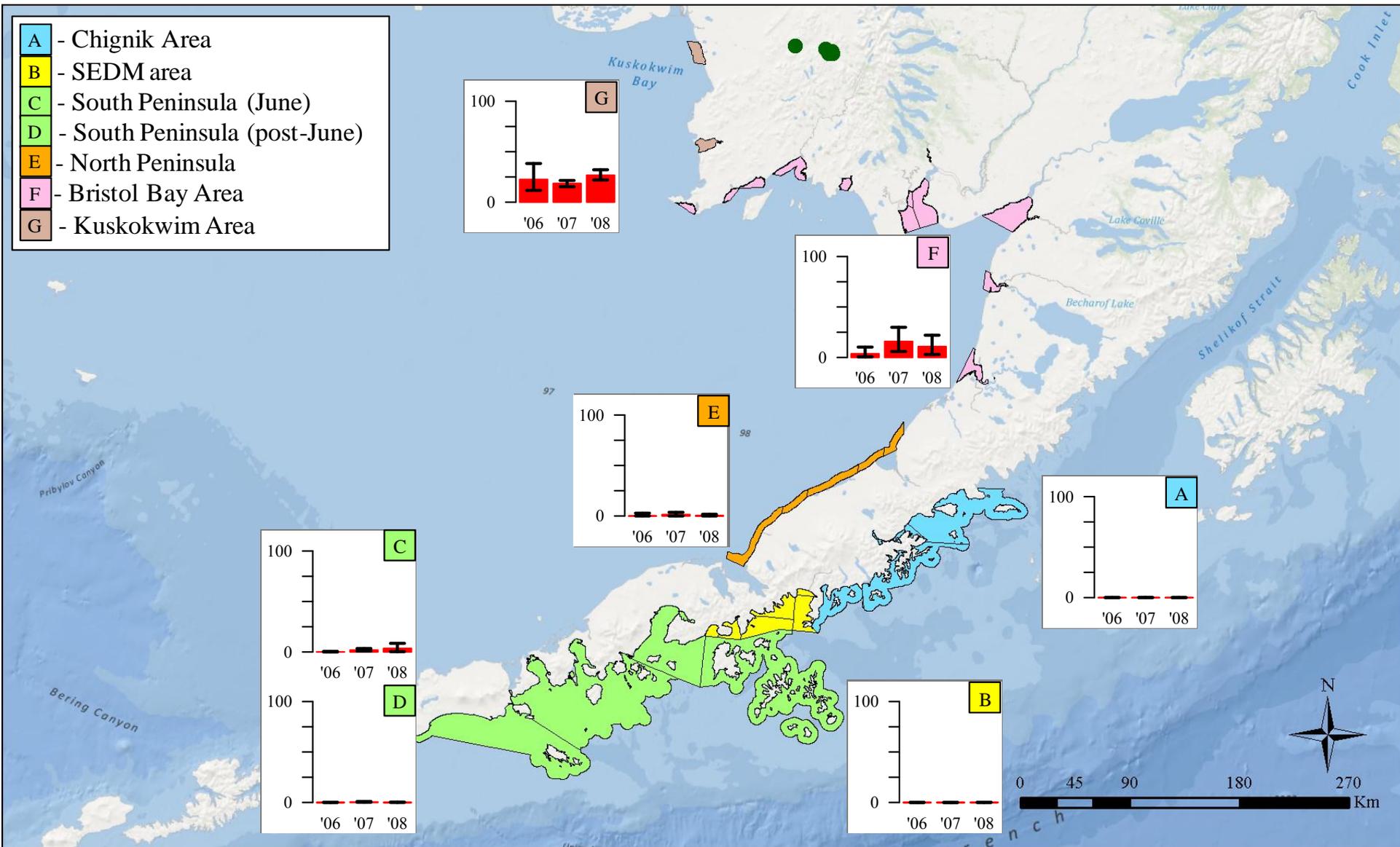


Figure 55.–

Goodnews River stock; harvest rate

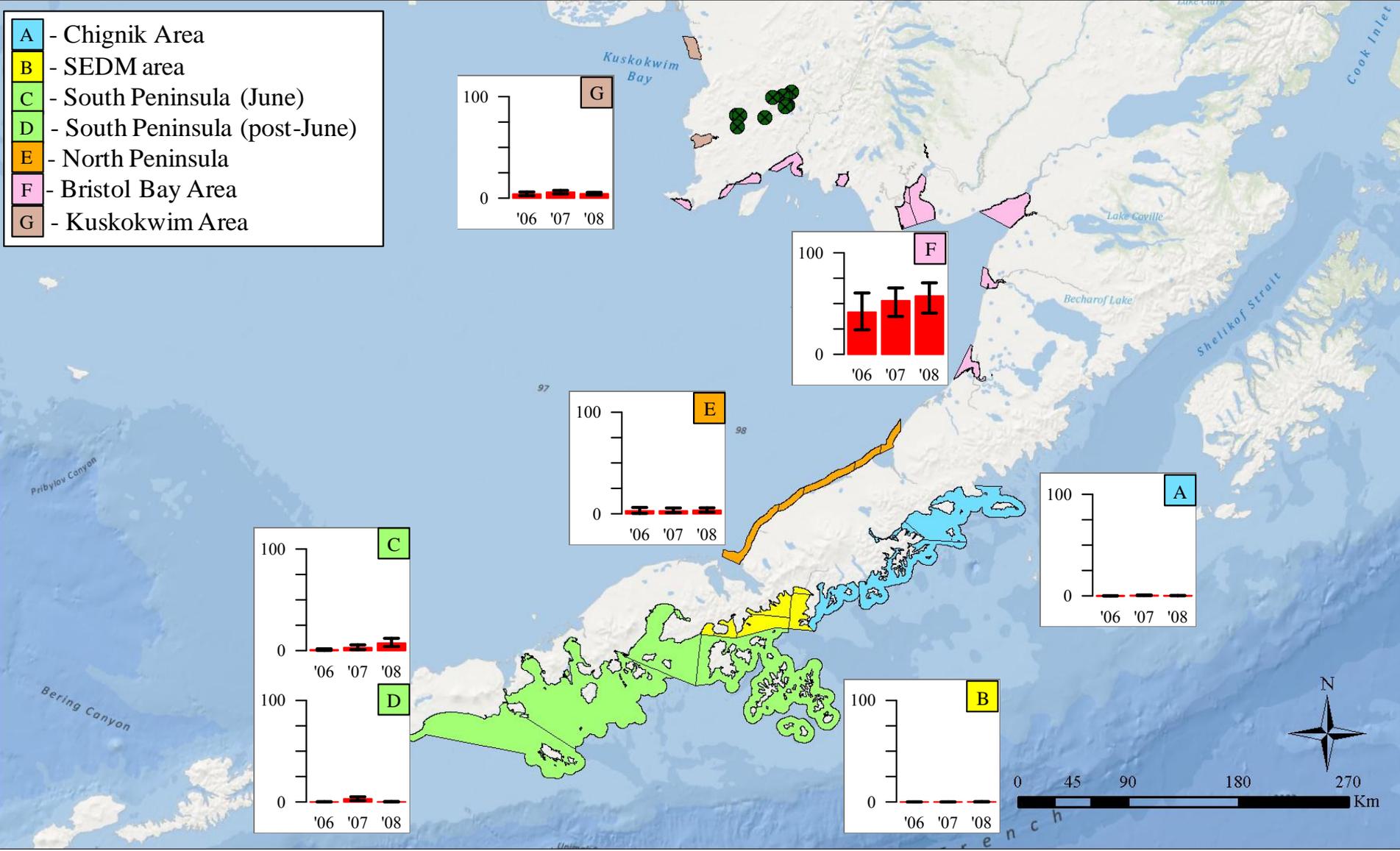


Figure 56.-

Summary

- A large collaborative effort in many ways
 - Number of organizations and people
 - Geographic extent and fisheries involved
 - Number of fish sampled and analyzed
 - Detail of results reported
- Information is publically available
 - Website: <http://www.adfg.alaska.gov/index.cfm?adfg=wassip.reports>
 - Background information – agendas, meeting notes, technical documents
 - 9 final reports

Kuskokwim Area King, Chum, Sockeye, Coho, and Pink Salmon Options for Revising the Amount Necessary for Subsistence (ANS) Findings



Hiroko Ikuta, Ph.D.

Subsistence Resource Specialist

RC 7, Tab 9



Proposal 104

- **Under AS 16.05.258(b), for fish stocks with customary and traditional (C&T) subsistence uses, the board “shall determine the amount of the harvestable portion that is reasonably necessary for subsistence uses...”**

Department Recommendation

SUPPORT reviewing the ranges of the amounts of salmon reasonably necessary (ANS) for subsistence uses.



Kuskokwim Area



Background of ANS Determination

Are there **customary and traditional (C&T) uses** of salmon?

✓ **Yes.**

- Positive finding in 1987.
- Reconfirmed in 1993.



Background of ANS Determination

Was the **amount reasonably necessary for subsistence (ANS)** determined?

✓ **Yes.**

- In 1993: Revisited C&T. ANS for “all salmon” for the Kuskokwim River was 192,000–242,000.
- In 2001: Species-specific ANS findings for the Kuskokwim river drainage and all salmon combined for the remainder of the Kuskokwim Area.



Kuskokwim River Drainage 2001 ANS Determination

**Ranges based on low and average
harvests, 1990–1999**

	Low	Average	High	ANS
King salmon	64,795	82,762	96,436	64,500– 83,000
Chum salmon	39,970	75,143	126,508	39,500– 75,500
Sockeye salmon	27,791	39,204	52,984	27,500–39,500
Coho salmon	24,864	34,803	50,370	24,500 –35,000

Remainder of Kuskokwim Area 2001 ANS Determination

**Ranges based upon low and average
harvests, 1990–1999**

	Low	Average	High	ANS
King salmon	3,535	4,511	6,699	n/a
Chum salmon	1,006	3,004	4,961	n/a
Sockeye salmon	823	2,073	3,420	n/a
Coho salmon	1,682	3,416	5,922	n/a
Total	7,046	13,004	21,002	7,500–13,500

Methodological Change in Estimating Subsistence Salmon Harvest, 2008

- Expand reported harvest estimates to represent the total harvest for those communities considered, including unsurveyed households and communities.
- The new estimates tended to be higher than the original estimates.
- Current ANS findings, adopted in 2001, appear to have been too low.



Kuskokwim River Drainage

OPTION A:

Ranges based on low and average harvests, **1990–1999**

Salmon species	Low	Average	High	Revised ANS	Current ANS
King salmon	72,775	89,016	109,778	72,800–89,000	64,500–83,000
Chum salmon	37,366	80,931	153,825	37,400–80,900	39,500–75,500
Sockeye salmon	30,905	42,438	51,616	30,900–42,400	27,500–39,500
Coho salmon	24,623	37,609	57,560	24,600–37,600	24,500–35,000

Kuskokwim River Drainage

OPTION B:

**Ranges based on low and average
harvests, 2000–2009
(except pink salmon 2005–2009)**

	Low	Average	High	Revised ANS	Current ANS
King salmon	67,228	84,182	98,099	67,200–84,200	64,500–83,000
Chum salmon	41,217	64,128	89,500	41,200–64,100	39,500–75,500
Sockeye salmon	32,237	43,253	58,732	32,200–43,300	27,500–39,500
Coho salmon	29,559	38,766	48,898	29,600–38,800	24,500–35,000
Pink salmon	517	1,269	1,989	500–1,300	n/a

Kuskokwim River Drainage

OPTION C:

Ranges based on low and average harvests, **1990–2009**
(except pink salmon 2005–2009)

Salmon species	Low	Average	High	Revised ANS	Current ANS
King salmon	67,228	86,599	109,778	67,200–86,600	64,500–83,000
Chum salmon	37,366	72,529	153,825	37,400–72,500	39,500–75,500
Sockeye salmon	30,905	42,846	58,732	30,900–42,800	27,500–39,500
Coho salmon	24,623	38,187	57,560	24,600–38,200	24,500–35,000
Pink salmon	517	1,269	1,989	500–1,300	n/a

South Kuskokwim Bay

Quinhagak, Goodnews Bay, and Platinum

OPTIONS D, E, and F

Ranges based on low and average harvests

Years	Low	Average	High	ANS Options	Current ANS
Option D: 1990–1999	6,939	11,312	16,975	6,900 –11,300	n/a
Option E: 2000–2009	8,973	11,593	16,220	9,000 –11,600	n/a
Option F: 1990–2009	6,939	11,286	16,975	6,900 –11,300	n/a

Bering Sea Coast

Cherfornak, Mekoryuk, Newtok,
Nightmute, Toksook Bay, and Tununak

OPTION G

**Range based on low and high harvests,
2011**

Year	Low	Estimated	High	ANS	Current ANS
2011	12,495	13,446	14,397	12,500 –14,400	n/a

OPTION H: No Action

- Maintain status quo by keeping the current ANS.





Questions?



Yukon River King, Summer Chum, Fall Chum, Coho, and Pink Salmon Options for Revising the Amounts Necessary for Subsistence Findings

Caroline Brown
Subsistence Resource Specialist III
RC 7, Tab 10

Department Recommendation

- **SUPPORT** reviewing the ranges of the amounts of salmon reasonably necessary for subsistence uses (ANS).



Dried fall chum salmon for dog food, Eagle.

Subsistence Salmon Harvest Monitoring Program

- Conducted by Division of Commercial Fisheries annually (Oct.-Nov.).
- Estimates result from combination of household surveys, permits, and calendars.
- Produces annual harvest estimates by species; includes information about gear and fish fed to dogs.

Background of ANS Determination

Board findings for Yukon Area salmon

Are there **customary and traditional uses** of salmon?

– **Yes.**

- Positive finding in 1987.
- Reconfirmed in 1993.

Background of ANS Determination

Was the **amount reasonably necessary for subsistence** (ANS) determined?

- **Yes.**

- In 1993: ANS for “all salmon” was 348,000–503,000.
- In 2001: species-specific ANS findings were established:

King salmon	45,500–66,704
Summer chum salmon	83,500–142,192
Fall chum salmon	89,500–167,900
Coho salmon	20,500–51,980

Changing Salmon Harvests

- **King salmon**
 - Harvests are relatively stable, except where restrictions have contributed to decreased harvests.
- **Summer chum salmon**
 - Harvest averages still within ANS range, but appear to have stabilized at lower level since loss of roe market in 1990s.
- **Fall chum salmon**
 - Harvests have declined, likely due to fewer dogs.
- **Coho salmon**
 - Harvests linked to fall chum salmon management.
- **Pink salmon**
 - New data available.

Yukon Area – **OPTION A:** **Ranges based on low and high harvests,** **2002–2011** **(except king salmon from 1990 through 1999)**

	Low	Average	High	ANS (current)	ANS (revised, low/high)
King salmon	45,500	52,109	63,915 ^a	45,500–66,704	45,500–63,900
Summer chum	77,934	92,145 ^b	115,078	83,500–142,192	77,900–115,000
Fall chum	62,526	84,807 ^c	101,221	89,500–167,900	62,500–101,200
Coho salmon	12,344	19,429 ^d	27,250	20,500–51,980	no change
Pink salmon	2,118	4,558	9,697	none	2,100–9,700

a. Low and high harvests reflect the year range used by the board to determine the original ANS; the department is not recommending a reevaluation of the ANS range, so these harvest estimates represent the same years used to establish the original ANS range.

b. Excludes 2001, 2003, and 2009.

c. Excludes 2002–2003 and 2009–2010.

d. Excludes 2002–2003 and 2009–2010.

Yukon Area – **OPTION B:** Range based on low and high harvests, **1990–2011** (except king salmon from 1990 through 1999)

	Low	Average	High	ANS (current)	ANS (revised, low/high)
King salmon	45,500	52,109	63,915 ^a	45,500–66,704	45,500–63,900
Summer chum	77,934	104,566 ^b	142,192	83,500–142,192	77,900–142,200
Fall chum	62,526	107,060 ^c	167,900	89,500–167,900	62,500–167,900
Coho salmon	12,344	28,199 ^d	51,980	20,500–51,980	no change
Pink salmon	2,118	4,558 ^e	9,697	none	2,100–9,700

a. Low and high harvests reflect the year range used by the board to determine the original ANS; the department is not recommending a reevaluation of the ANS range, so these harvest estimates represent the same years used to establish the original ANS range.

b. Excludes 2001, 2003, and 2009.

c. Excludes 2002–2003 and 2009–2010.

d. Excludes 2002–2003 and 2009–2010.

e. Excludes 2000–2001.

OPTION C: No Action

- Maintain status quo by keeping the current ANS.

Questions?

